EMULEX®

HBAnyware® Utility

Version 4.1

User Manual

HBAnyware is part of the OneCommand™ Software Framework

One Network.
One Company.
Connect with Emulex.

P003412-01B Rev. A

Information furnished by Emulex is believed to be accurate and reliable. However, no responsibility is assumed by Emulex for its use; or for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent, copyright or related rights of Emulex.

Emulex provides this manual "as is" without any warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability or fitness for a particular purpose. Emulex may make improvements and changes to the product described in this manual at any time and without any notice. Emulex assumes no responsibility for its use, nor for any infringements of patents or other rights of third parties that may result. Periodic changes are made to information contained herein; although these changes will be incorporated into new editions of this manual, Emulex disclaims any undertaking to give notice of such changes.

Emulex, 3333 Susan Street
Costa Mesa, CA 92626

Introduction

The HBAnyware® utility is a powerful, centralized adapter management suite, providing discovery, reporting and management of local and remote adapters from a single console anywhere in the SAN and across platforms. Both a graphical user interface (GUI) and command line interface (CLI) are provided. This remote configuration capability can be provided by either Fibre Channel (FC) access via host systems on the same FC Storage Area Network (SAN) or by Transmission Control Protocol/Internet Protocol (TCP/IP) access from IP addresses of remote machines.

This manual supports the following versions of the HBAnyware utility:

- Windows
- Solaris SFS (‘emlxs’ is the module name for the Emulex driver for Solaris SFS)
- Linux
- VMware ESX Server

Use the HBAnyware utility to do any of the following (refer to Table 1 to determine if a specific feature or task is supported by your operating system):

- Discover local and remote hosts, adapters, targets, virtual ports, virtual machines, switches and Logical Unit Numbers (LUNs)
- Enable local and FC discovery of Emulex and OEM branded Emulex adapters
- Change an adapter’s World Wide Port Name (WWPN) or World Wide Node Name (WWNN)
- Reset adapters
- Set up persistent binding
- Set adapter driver parameters simultaneously to multiple HBAs using Batch Update
- Set global driver parameters for adapters
- Update firmware and FC boot code (x86 BootBIOS, OpenBoot or EFIBoot) on a single adapter or multiple adapters using Batch Update
- Enable or disable the adapter BIOS (x86 BootBIOS, FCode or EFIBoot)
- Run diagnostic tests on adapters
- Manage local, FC remote and TCP/IP-accessed adapters
- Locate adapters using beaconing
- Mask and unmask LUNs
- Perform authentication using the Fibre Channel Security Protocol Diffie-Hellman Challenge Handshake Authentication Protocol (FC-SP DHCHAP)
- Create and delete virtual ports (N_Port_ID virtualization [NPIV] must be enabled)
- Run in read-only mode
- Configure boot from SAN
- Modify an IP port number
- View vital product data (VPD) for the selected adapter port
- View transceiver information for the selected adapter port
- Save reports about discovered SAN elements
- Manage adapters on VMware ESX servers being managed through the Common Information Model (CIM) interface (New in version 4.1)
- Enable or disable an adapter’s FCOE Initialization Protocol (FIP) (New in version 4.1)

- Supports COMSTAR (COmmon Multiprotocol SCSI TARget) for Solaris 11(build 90 or later) enabling the Emulex driver for Solaris (EMLXS) to make a host appear as a target to the SAN. (New in version 4.1)

Supported Features by Operating System

Not all HBAnyware utility features are supported across all operating systems. The following table lists the HBAnyware utility features and their operating system support.

Table 1: The HBAnyware Utility Features and Tasks Cross-Reference

Feature/Task	Windows	Solaris SFS	Linux	VMware ESX Server
HBAnyware Graphical User Interface (GUI)	X	X	X	X*
HBAnyware Command Line Interface (CLI)	X	X	X	X
HBAnyware with Web Launch utility	X	X	X	
HBAnyware Security Configurator	X	X	X	
Discover local hosts, adapters, targets and LUNs	X	X	X	X*
Discover remote hosts, adapters, targets and LUNs	X	X	X	X*
Enable local discovery of Emulex and OEM branded Emulex adapters	X	X	X	X*
Enable FC discovery of Emulex and OEM branded Emulex adapters	X	X	X	X*
Change an adapter’s WWPN or WWNN	X	X	X	X*
Reset adapters	X	X	X	X*
Set up persistent binding	X			
Set adapter driver parameters simultaneously to multiple adapters	X	X	X	
Set global driver parameters to adapters	X	X	X	X**
Boot from SAN functionality	X	X	X	X
Update firmware and FC boot code on a single adapter or multiple adapters using batch update	X	X	X	X*
Enable or disable the x86 BootBIOS, EFI or OpenBoot	X	X	X	X*
Run diagnostic tests on adapters	X	X	X	
Manage local adapters	X	X	X	X*
Manage FC remote and TCP/IP accessed adapters	X	X	X	X*
Locate adapters using beaconing	X	X	X	X
Mask and unmask LUNS	X			

Table 1: The HBAnyware Utility Features and Tasks Cross-Reference (Continued)

Feature/Task	Windows	Solaris SFS	Linux	VMware ESX Server
Perform authentication using FC-SP DHCHAP	X	X	X	
Create and delete virtual ports	X	X	X	
Run in read-only mode	X	X	X	X*
Configure boot from SAN	X	X	X	X*
Modify an IP port number	X	X	X	X*
View vital product data	X	X	X	X*
View transceiver information	X	X	X	X*
Save SAN element reports	X	X	X	X*
Manage adapters using CIM	X	X	X	
Enable or disable FIP	X	X	X	X*
COMSTAR support		X		
Adapter hot swapping/hot plugging	X			

* Supported only by hbacmd for the VMware release of the HBAnyware utility, version 4.1. Remote management clients can perform these functions on ESX Server HBAs using the HBAnyware GUI.

** Temporary (not persistent) driver parameters are supported on VMware ESX 3i Update 4 and versions of VMware ESX 3.5 prior to Update 4.

Known Issues

See the product release notes for the latest information.

Installing and Uninstalling HBAnyware Components

Installing the HBAnyware Utility

In Windows

The AutoPilot Installer® software streamlines the Emulex driver and HBAnyware utility installation. Refer to the Quick Installation Manual for more information. This manual is available on the Emulex Web site for your driver version.

The following must be installed before you can install the utilities:

- Java version 5.0 or later. The HBAnyware utilities do not run on previous versions of the JRE. The JRE and instructions for installation are available at http://java.sun.com/downloads/index.html.

In Solaris SFS, Linux and VMware ESX

The following must be installed before you can install the utilities:

- The appropriate driver for your operating system:
    - Solaris SFS driver version 2.40 or later
    - Linux driver version 8.2.0.33.3p or later
    - Linux driver version 8.2.8.x or later
    - Emulex Driver for VMware ESX, version 7.4 or later. Refer to the Emulex Driver for VMware ESX User Manual for specific information on driver support in ESX Releases.
- Java version 5.0 or later. (Java not supported on VMware.)

  The HBAnyware utilities do not run on previous versions of the JRE. The JRE and instructions for installation are available at http://java.sun.com/downloads/index.html.

  Caution: The utilities require Java runtime binaries and libraries. Their paths must be included at the beginning of the PATH environment variable to avoid conflicts with earlier versions of Java that can still be installed on the system. For example, if the Java runtime binaries are in /usr/java/bin, then include this path in the PATH environment variable. For example: (bash> export PATH="/usr/java/bin:$PATH")

- For Solaris SFS, the Emulex Fibre Channel Adapter (FCA) utilities; refer to the FCA Utilities User Manual for instructions on unpacking and installing the FCA utilities.
- In Linux, previous versions of the Application Helper Module must be uninstalled. You must run the uninstall script that shipped with the version of the Application Helper Module you want to remove.

To install the HBAnyware utilities in Solaris SFS:

1. Copy the Solaris utility kit to a temporary directory on your system.
2. Untar the main utility kit tar file:
   ```
   tar xvf HBAnyware-<version>.tar
   ```
3. Untar the platform-specific kit:
   ```
   tar xvf HBAnyware-<version>-<platform>.tar
   ```
4. Untar the Fibre Channel driver utilities:
   ```
   tar xvf emlxu_kit-<version>-<platform>.tar
   ```

5. Install the driver utilities:

   ```
   ./emlxu_install
   ```

6. Untar the EmlxApps file:

   ```
   tar xvf EmlxApps<version>-<platform>.tar
   ```

7. Uncompress and untar the HBAnyware application package:

   ```
   gunzip HBAnyware-<version>-<platform>.tar.gz
   tar xvf HBAnyware-<version>-<platform>.tar
   ```

8. Remove the existing HBAnyware and Security Configurator applications (if present) using the pkgrm utility:

   ```
   pkgrm HBAnywareSSC
   pkgrm HBAnyware
   ```

9. 9. Install the HBAnyware package using the pkgadd utility:

   ```
   pkgadd -d .
   ```

10. When prompted by pkgadd, choose to install the HBAnyware utilities.

To install the HBAnyware utilities in Linux:

Note: The HBAnyware utility GUI and Security Configurator (SSC) GUI applications are not supported on Linux for the IA64 platform.

1. Log on as ‘root’.
2. Download the utilities from the Emulex Web site or copy them to the system from the installation CD.
3. Copy the installation and uninstallation scripts to a known location, for easy access by other users.
4. Copy the ElxLinuxApps-<AppsRev><DriverRev>.tar file to a directory on the install machine.
5. Change (use cd command) to the directory to which you copied the tar file.
6. Untar the file. Type:

   ```
   tar -xvf ElxLinuxApps-<AppsRev><DriverRev>.tar
   ```

7. Uninstall any previously installed versions. Type:

   ```
   ./uninstall
   ```

8. Run the install script. Type:

   ```
   ./install
   ```

9. Enter the type of management you want to use:

   ```
   1   Local Mode  : HBA's on this Platform can be managed by HBAnyware
   clients on this Platform Only.
   2   Managed Mode: HBA's on this Platform can be managed by local or
   remote HBAnyware clients.
   3   Remote Mode : Same as '2' plus HBAnyware clients on this Platform can
   manage local and remote HBA's.
   ```

10. If you answered **<2>** or **<3>** in step 9, you are asked if you want the HBAnyware utility to operate in read-only mode. Read-only mode prevents users from performing certain operations such as resetting HBAs, updating an adapter's firmware and changing adapter driver properties and bindings. Enter **<y>** 'for yes to allow the user to perform these operations, enter **<n>** for no if read-only mode is desired.
11. You are prompted as to whether or not to allow users to change the management mode after installation. Enter <y> for yes, or <n> for no.

You can also install the Applications Kit on an upgraded kernel. The LPFC driver must be part of the target kernel distribution and the utilities package must have been installed on the current kernel.

To install the Applications Kit on an upgraded kernel:

1. Boot to the new kernel.
2. Log on as ‘root’.
3. Change (use the cd command) to the directory containing the unpacked Applications Kit.
4. Run the install upgrade kernel script. Type:

   ```
   ./install upgradekernel
   ```

The LPFC driver must be loaded before you can install the HBAnyware Agent.

To install the HBAnyware Agent in VMware ESX Server:

1. Log in as ‘root’.
2. Copy the `elxvmwarecorekit-esxNN-<AppsRev>.rpm` file to a directory on the install machine, where NN is 35 for an ESX 3.5 system or 40 for an ESX 4.0 system.
3. CD to the directory to which you copied the rpm file.
4. Install the rpm. Type:

   ```
   rpm -ivh elxvmwarecorekit-esxNN-<AppsRev>.rpm
   ```

   Where NN is 35 for an ESX 3.5 system or 40 for an ESX 4.0 system. The rpm contents are installed in /usr/sbin/hbanyware. The hbacmd utility is also located in this directory. See “Using the HBAnyware Utility Command-Line Interface” on page 124 for more information.

Installing the HBAnyware Utility with Web Launch

Prerequisites

In addition to the driver and HBAnyware utilities, the following prerequisites must be met before you install the Web Launch feature:

Note: The HBAnyware utility with Web Launch is not supported on VMWare ESX Server.

In Windows:

- Microsoft Internet Information Services (IIS) Server must be installed. See the Microsoft Web site for information on downloads and installation.
- Java 5.0 or later must be installed. See the www.java.com Web site for information on downloads and installation.
- The Windows Firewall feature may be enabled by default. If it is, you must add and enable three exceptions: HTTP port, java.exe and rmiregistry.exe (both included with the JRE).

  Note: Allowing programs and/or ports through the firewall may increase the security risks. Use at your own discretion

  To enable the HTTP port:

  1. Click **Add Port...** The Add a Port dialog box is displayed.
  2. On the Add a Port dialog box, type `HTTP` as the Name and `80` as the Port Number.
  3. Leave the radio button on **TCP** and click **OK**.

To enable the java.exe program:

1. Click **Add Program...** The Add a Program dialog box is displayed.
2. Click **Browse...**
3. Specify java.exe located in the bin directory of the JRE installation path. Example: `C:\Program Files\Java\jre1.6.0_06\bin\java.exe`.
4. Click **OK**.

To enable the rmiregistry.exe program

1. Click **Add Program...**The Add a Program dialog box is displayed.
2. Click **Browse...** and specify the rmiregistry.exe located in the bin directory of the JRE installation path. Example: `C:\Program Files\Java\jre1.6.0_06\bin\rmiregistry.exe.`
3. Click **OK**.
4. Click **OK** to apply the new firewall settings.

- In Solaris SFS and Linux:
  - Apache must be installed and running on the server that is hosting the Web Launch Service software.
  - The Java Web Start application must be installed and running on the browser host.

  The system on which you are installing the Web Launch Service package (the server) requires:

  - An HTTP server configured to handle the JNLP MIME file type. The following MIME file type/file extension must be added to your server configuration:

    ```
    MIME type: application/x-java-jnlp-file
    File Extension: jnlp
    ```

  - The HTTP server must be running.

  The system on which you are running the browser (the client) requires:

  - Java must be installed. The HBAnyware-installed JRE must match the HBAnyware code base. Specific requirements:
    - Sun 32-bit Java 5.0 or later for Intel based systems (x86 and IA64)
    - Sun 32-bit Java 5.0 or later for x86-64 systems
  - 64-bit Java 5.0 or later for RH4 and SL9 (ppc64)
  - 32-bit Java 5.0 or later for RH5 and SL10 (ppc64)

  Refer to the appropriate vendor documentation for detailed instructions about configuring MIME types, configuring and starting the HTTP server and installing the JRE.

Procedures

To install the HBAnyware utility with Web Launch:

In Windows (Windows Server 2003, Windows Vista and Windows Server 2008):

1. Click **Programs>Emulex >HBAnyware WebLaunch Install.** Web Launch installation begins.

In Solaris SFS and Linux:

1. Log on as ‘root’.
2. Navigate to the HBAnyware directory.
   - Solaris SFS:

     ```
     cd /opt/HBAnyware
     ```

- Linux:

  ```
  cd /usr/sbin/hbanyware
  ```

3. Run the install script. Type:

   ```
   ./wsinstall
   ```

4. When prompted, enter the Web server's document root directory. For example:

   ```
   /srv/www/htdocs
   ```

5. You are provided with the IP address of the host and asked if that is the IP address that the Web server uses. Answer **<y>** or **<n>** as appropriate. If you answer **<n>**, you are prompted for the IP address you want to use.
6. You are asked if your Web server is listening on the normal default HTTP port (80). Answer **<y>** or **<n>** as appropriate. If you answer **<n>**, you are prompted for the port you want to use.

   Once you have entered the necessary information, you are notified when the installation of the HBAnyware Web Launch package is complete. The Web Launch configuration files are created and Web Launch Service automatically starts.
7. To verify the installation, locate another client, open a Web browser window and enter this URL according to this format:

   ```
   http://IP_ADDR:PORT_NUM/hbanyware.jnlp
   ```

   where *IP_ADDR* is the IP address of host on which you installed the HBAnyware Web Launch service, and *PORT_NUM* is the TCP port number of the listening hosts' Web server. The standard HBAnyware user interface is displayed.

   Note: It is not necessary to enter a port number if the standard HTTP port was chosen during configuration.

Installing the HBAnyware CLI

Introduction

The HBAnyware CLI is a separate application with core driver kits that do not include the HBAnyware GUI. The HBAnyware CLI console application name is hbacmd and can be installed on Windows, Linux and versions of VMware ESX Server that include a Console Operating System (COS). A single operation is performed by entering ’hbacmd’ at the command line. For syntax information and details on using the HBAnyware CLI, see “Using the CLI Client” on page 126.

Platforms that are supported with the HBAnyware CLI are detailed in Table 2.

Table 2: HBAnyware Command Line Interface Supported Platforms

Driver	Architecture	Operating System
Storport Miniport Driver	Intel x86, x64 and IA64 **Note:** Intel IA64 is supported on Fibre Channel adapters only.	Windows Server 2003 Windows Server 2008 Windows Vista
LPFC 7.4.x Driver	Intel x86, EM64T and AMD64	VMware ESX Server 3.5
LPFC 8.2.0.30.xvmw Driver	Intel EM64T and AMD64	VMware ESX Server 4.0

Table 2: HBAnyware Command Line Interface Supported Platforms (Continued)

Driver	Architecture	Operating System
LPFC 8.2.0.33.3p Open Source Driver for Red Hat (RHEL) 5.1 and later, SUSE Linux Enterprise Server (SLES) 10-SP1 and later	Intel x86, EM64T, AMD64, PPC64 and IA 64	RHEL 5.1 and later, and SUSE Linux Enterprise Server 10-SP1 and later
LPFC 8.2.8.x Open Source Driver for SUSE Linux Enterprise Server 11	Intel x86, EM64T, AMD64, PPC64 and IA 64	SUSE Linux Enterprise Server 11

In Windows

To install the HBAnyware CLI, run an installation .exe file for a core Windows driver kit that does not include the HBAnyware GUI:

- storportminiportcorekit_[version].exe

  [version] represents the complete version. For example, storportminiportcorekit_2-10a7-1e.exe.

In Linux

The following must be installed before installing the core kit:

- For existing systems, the 8.2.x.x driver must be installed.
- For new systems, the specific driver RPM for your Linux version must be installed.

To install the core kit:

1. Copy the Applications Kit tar file to a directory on the installation machine.
2. Change (use cd command) to the directory to which you copied the tar file.
3. Untar the file. Type:
   ```
   tar -xvf tarfilename
   ```
4. Change (use cd command) to the appropriate sub-directory associated to the target machine architecture and OS distribution.
5. su to ‘root’.
6. Type:
   ```
   rpm -Uhv *.rpm
   ```
7. Type:
   ```
   /usr/sbin/hbanyware/hbacmd
   ```
   to run the script utility.

Installing the HBAnyware CLI on a Linux System With an Existing HBAnyware CLI Kit Installed

Follow these steps to install the HBAnyware CLI on a Linux system with an existing HBAnyware CLI kit installed:

1. Uninstall the Linux core kit. Type:

   ```
   rpm -e elxlinuxcorekit-[version]
   ```

   Note: If the uninstallation script does not work, you have an older HBAnyware kit. In this case, follow the procedure for **Uninstalling Older HBAnyware Kits on VMware** in this topic.

2. Install the specific RPM for your driver for Linux version. Enter this command (all in one line):

   ```
   rpm -i elxlinuxcorekit-[version].rpm
   ```

   Note: You can also upgrade to a newer CLI kit when there is an existing CLI kit installed. This is useful if you modified some of the Core Kit configuration files, such as the authentication daemon's fcauth.conf file. When an upgrade is performed, RPM will use the previous configuration (when possible).
   To perform an upgrade, type:
   rpm -U elxlinuxcorekit-[version].rpm

Uninstalling Older HBAnyware Kits on Linux

1. Locate and download the full application tar file for the appropriate Linux version.
2. Untar the tar file and run the installation script to install the application.

   If the HBAnyware Security Configurator is installed, it must be uninstalled before uninstalling the HBAnyware utility. You must run the uninstall script that shipped with the version of HBAnyware Security Configurator that you want to remove. Proceed to step 3. If the Security Configurator is not installed, proceed to step 4.
3. If the HBAnyware Security Configurator is installed, follow these steps:
   a. Log on as ‘root’.
   b. Change (use cd command) to the directory to which you copied the tar file during installation.
   c. Run the uninstall script with the ssc parameter specified. Type:

   ```
   ./uninstall ssc
   ```

4. Uninstall HBAnyware, lputil and the Application Helper Module:
   a. Log on as ‘root’.
   b. Change (use cd command) to the directory to which you copied expanded the tar file during installation.
   c. Uninstall any previously installed versions. Type:

   ```
   ./uninstall
   ```

In VMware

To install the HBAnyware CLI on a new system, install the specific RPM for the driver for your VMware version.

Prerequisites

- The LPFC driver must be loaded.

Procedures

To install the HBAnyware CLI:

1. Log in as ‘root’.
2. Copy the elxvmwarecorekit-<kit version>.rpm file to a directory on the install machine.
3. CD to the directory to which you copied the rpm file.
4. Install the rpm. Type:

   ```
   rpm -U elxvmwarecorekit-esxNN-<kit version>.rpm
   ```

   Where NN is 35 for an ESX 3.5 system or 40 for an ESX 4.0 system. The rpm contents are installed in /usr/sbin/hbanyware. The hbacmd utility is also located in this directory.

Installing the HBAnyware CLI on a VMware System with an Existing HBAnyware CLI Kit Installed

To install the HBAnyware CLI on a VMware system with an existing HBAnyware CLI kit installed:

1. Install the RPM by entering the following command all on one line:

   ```
   # rpm -U elxvmwarecorekit-esxNN-<version>.rpm
   ```

   Where NN is 35 for an ESX 3.5 system or 40 for an ESX 4.0 system.

Uninstalling Older HBAnyware Kits on VMware

To uninstall older kits on VMware:

1. Log in as ‘root’.
2. Type: `rpm -qa | grep elx` and locate the following rpm file:

   ```
   elxvmwarecorekit-<kit version>
   ```

   The rpm contents are installed in /usr/sbin/hbanyware. The hbacmd utility is also located in this directory.
3. Type:

   ```
   rpm -e elxvmwarecorekit-<kit version>
   ```

Upgrading from CLI to Full-Featured HBAnyware

In Windows

To upgrade from the HBAnyware CLI to the full-featured HBAnyware utility:

1. From the desktop, run the .exe file that contains the full application kit.

   Running this executable file removes the HBAnyware CLI and installs a full-featured version of the HBAnyware utility that includes the CLI and the GUI.

In Linux

To upgrade from the HBAnyware CLI to the full-featured HBAnyware utility:

1. Uninstall the core kit, using rpm -e elxlinuxcorekit-[version].
2. Install the HBAnyware kit, using the install script within the tar file. See “Installing the HBAnyware Utility” on page 4.

In VMware

The full-featured HBAnyware kit is not supported on VMware ESX Server.

Installing the HBAnyware Utility Security Configurator

The Emulex driver and the HBAnyware utilities must be installed before you can install the HBAnyware Security Configurator.

Note: The HBAnyware utility Security Configurator is not supported on VMWare ESX Server.

To install the HBAnyware utility Security Configurator:

In Windows:

1. Locate the SSCsetup.exe file. The default path for this file is:

   ```
   C:\Program Files\Emulex\Util\HBAnyware
   ```

2. Double-click the **SSCsetup.exe** file. A welcome window appears.
3. Click **Next**. The Setup Status window is displayed. After setup completes, the Emulex HBAnyware Security Setup Completed window appears.
4. Click **Finish**.

In Solaris SFS:

1. Unpack the Solaris utility kit (see “Installing the HBAnyware Utility” on page 4. for more information).
2. Uncompress and untar the Security Configurator application package:

   ```
   gunzip HBAnywareSSC-<version>-<platform>.tar.gz
   tar xvf HBAnywareSSC-<version>-<platform>.tar
   ```

3. Install the Security Configurator package using the pkgadd utility:

   ```
   pkgadd -d .
   ```

4. When prompted by pkgadd, choose to install the HBAnywareSSC utilities.

In Linux:

1. Log on as ‘root’.
2. Change (use the cd command) to the directory to which you copied the tar file.
3. Run the install script with the ssc parameter specified. Type:

   ```
   ./install ssc
   ```

Uninstalling the HBAnyware Security Configurator

To uninstall the HBAnyware Security Configurator:

In Windows:

1. Select **Start>Settings>Control Panel**. The Control Panel appears.
2. Click **Add/Remove Programs**. The Add or Remove Programs window appears.
3. Select **Emulex HBAnyware Security Configurator>Change/Remove**.
4. Click **Next**. The Security Configurator is removed from the system.
5. Click **Finish**. Uninstallation is complete.

In Solaris SFS:

1. Log on as ‘root’.

   Note: If the HBAnyware Security Configurator is installed, it must be uninstalled before uninstalling the HBAnyware and driver utilities.

2. Type:

   ```
   pkgrm HBAnywareSSC
   ```

In Linux:

Note: You must run the uninstall script that shipped with the version of HBAnyware Security Configurator you want to remove. If the uninstall script resides in the usr/src directory, be sure to copy it to a temporary directory before you run it.

1. Log on as ‘root’.
2. Change (use the cd command) to the directory to which you copied the tar file during installation.
3. Run the uninstall script with the ssc parameter specified. Type:

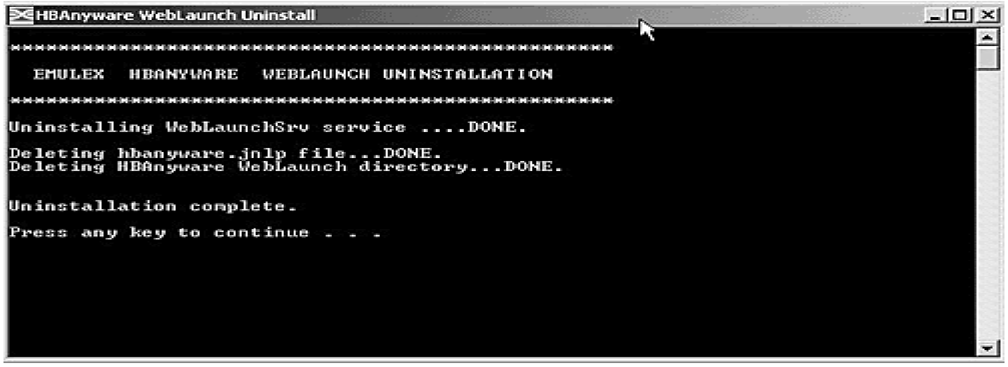
   ```
   ./uninstall ssc
   ```

Uninstalling HBAnyware Web Launch Only

To uninstall HBAnyware Web Launch, but leave the HBAnyware utility installed:

In Windows:

1. Select **Start> Programs>Emulex>HBAnyware WebLaunch Uninstall**. The following screen appears:



```
**************************************************
  EMULEX  HBANYWARE  WEBLAUNCH UNINSTALLATION
**************************************************
Uninstalling WebLaunchSrv service ....DONE.

Deleting hbanyware.jnlp file...DONE.
Deleting HBAnyware WebLaunch directory...DONE.

Uninstallation complete.

Press any key to continue . . .
```

Figure 1: HBAnyware Web Launch, Uninstall screen

2. HBAnyware Web Launch is removed. Press any key to continue.

In Solaris SFS and Linux:

1. Log on as ‘root’.

   Note: If you installed HBAnyware with Web Launch, you must uninstall it before uninstalling the HBAnyware utility.

2. Execute the uninstallation script.
   - Solaris SFS:

     ```
     /opt/HBAnyware/wsuninstall
     ```

- Linux:

  ```
  /usr/sbin/hbanyware/wsuninstall
  ```

This script stops the HBAnyware Web Launch Service daemons (if they are running) and removes all Web Launch related files from the host.

Uninstalling the HBAnyware Utility

To uninstall the HBAnyware utility and HBAnyware Web Launch:

In Windows:

1. Select **Start>Settings>Control Panel**. The Add/Remove Programs window appears. Select the **Install/Uninstall** tab.
2. Select **Emulex HBAnyware** and click **Remove**. Click **Yes**. The utilities are removed from the system.
3. Select Emulex Common SAN Management and click **Remove**. Click **Yes**. The Emulex Common SAN Management components are removed from the system.
4. Click **Finish**. Uninstallation is complete.

In Solaris SFS:

1. Log on as ‘root’.
2. Type:

   ```
   pkgrm HBAnyware
   ```

In Linux:

1. Log in as ‘root’.
2. Obtain the current core kit RPM package name using the query:

   ```
   rpm -qa | grep elxlinux
   ```

3. Erase the core kit package returned in step 1 using RPM erase:

   ```
   (rpm -e xxxx) command
   ```

In VMware ESX Server (uninstalls the HBAnyware Agent):

1. Log in as ‘root’.
2. Type:

   ```
   rpm -qa | grep elx
   ```

3. Locate the elxvmwarecorekit-<kit version>.rpm file. The .rpm contents are installed in /usr/sbin/hbanyware. The hbacmd utility is also located in this directory.
4. Type:

   ```
   rpm -e elxvmwarecorekit-<kit version>
   ```

Starting the HBAnyware Utility

To start the HBAnyware utility:

In Windows:

On the Windows desktop, select **Start>All Programs>Emulex>HBAnyware**.

In Solaris SFS and Linux:

1. Log on as ‘root’.
2. Run the script to start the HBAnyware utility.
   - On Solaris SFS:

     ```
     /opt/HBAnyware/hbanyware
     ```
   - On Linux:

     ```
     /usr/sbin/hbanyware/hbanyware
     ```

Starting HBAnyware with Web Launch

After the HBAnyware Web Launch software is installed and the Web Launch server is initialized, you can launch the HBAnyware utility directly with your Web browser.

Note: Only the HBAnyware Web Launch GUI is exported to the requesting client. All adapter discovery and remote management operations are performed by resources running on the remote host that served up the GUI component. Therefore, the SAN view displayed by the GUI is not from the client running the GUI, but rather from the host from which this GUI was retrieved.

To launch the HBAnyware utility with your Web browser:

1. Open your Web browser. Linux and Solaris users must log on as ‘root’.
2. Enter the URL of an HBAnyware.jnlp file. Make sure that the URL specifies a remote server which has the HBAnyware Web Launch software installed and running.

   ```
   http://IP_ADDR:PORT_NUM/hbanyware.jnlp
   ```

   where *IP_ADDR* is the IP address of the host on which you installed the HBAnyware Web Launch Service, and *PORT_NUM* is the TCP port number of the listening hosts' Web server. The standard HBAnyware user interface is displayed.

Managing Files when Running HBAnyware with Web Launch

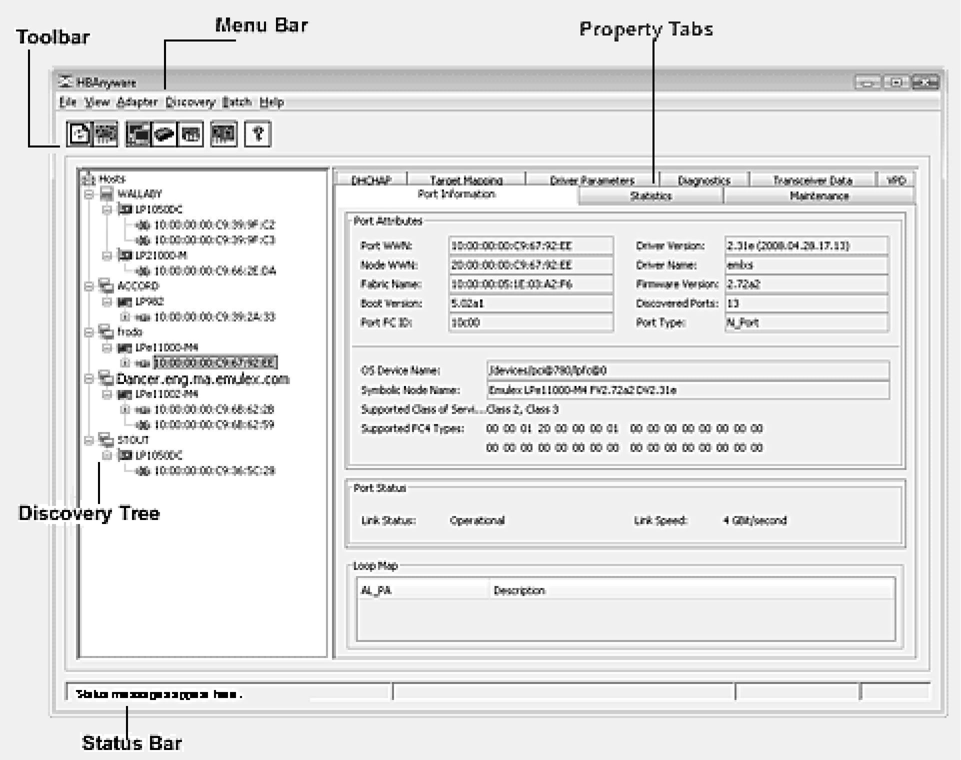
When running HBAnyware with Web Launch, all files (log files, driver parameter files, firmware files, etc.) are located on the browser launch host, which is not necessarily the same as the remote host that is specified in the Web launch address.

Using HBAnyware

Note: To properly view the HBAnyware utility, ensure your system meets the following display requirements:
For Windows systems, the display resolution must be set to 800 by 600 or better.
For Linux and Solaris systems, the display resolution must be set to 1024 by 768 or better.
The display must run in 256-color mode or higher. HBAnyware icons use 256 colors. If the display is set for 16 color mode, HBAnyware icons are not displayed.

The HBAnyware Utility Window Element Definitions

The HBAnyware utility window contains five basic components: the menu bar, the toolbar, the discovery-tree, the property tabs and the status bar.



Port Attributes

Port WWN: 10:00:00:00:C9:67:92:EE
Node WWN: 20:00:00:00:C9:67:92:EE
Fabric Name: 10:00:00:05:1E:03:A2:F6
Boot Version: 5.02a1
Port FC ID: 10c00
Driver Version: 2.31e (2008.04.28.17.13)
Driver Name: emlxs
Firmware Version: 2.72a2
Discovered Ports: 13
Port Type: N_Port

OS Device Name: /devices/pci@780/lpfc@0
Symbolic Node Name: Emulex LPe11000-M4 FV2.72a2 DV2.31e
Supported Class of Servi... Class 2, Class 3
Supported FC4 Types: 00 00 01 20 00 00 00 01 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Port Status

Link Status: Operational
Link Speed: 4 Gbit/second

Loop Map

AL_PA	Description

Status messages appear here.

Figure 2: HBAnyware Utility window

Note: The element you select in the discovery-tree determines whether a menu item or toolbar icon is active. For example, if you select the local host or other system host, the Reset Adapter item on the Adapter menu is unavailable. The Reset Adapter toolbar button is unavailable as well.

Note: Screenshots in this manual are for illustrative purposes only. Your system information can vary.

Note: The features displayed by your local HBAnyware interface will match those of the remote server. When accessing a remote server running an older version of the HBAnyware utility, features that are not supported by the server's older version of the HBAnyware utility are unavailable.

Note: In some instances, the type of information displayed and available functionality is determined by the operating system in use.

The Menu Bar

The menu bar contains commands that enable you to perform a variety of tasks such as exiting the HBAnyware utility, resetting adapters and sorting items in the discovery-tree view. Many of the menu bar commands are also available from the toolbar.

The Toolbar

The toolbar contains buttons that enable you to refresh the discovery-tree, reset the selected adapter and choose how you want to view discovered SAN elements in the discovery-tree. Many of the toolbar functions are also available from the menu bar.

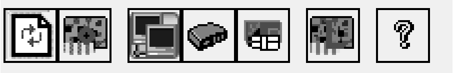


Figure 3: Toolbar

The toolbar is visible by default. Use the Toolbar item in the View menu to hide the toolbar. If the item is checked, the toolbar is visible.

The Toolbar Buttons

The toolbar buttons perform the following tasks:

Discovery Refresh button

- Refreshes the discovery cycle. A discovery refresh finds any new targets or virtual ports that were added to the SAN and removes any targets or virtual ports that were removed.

Reset button

- Resets the selected adapter.

The View Buttons on the Toolbar

The View buttons on the toolbar enable you to view SAN elements from the host, fabric, virtual ports, or by local or remote adapter perspective. By default, both local and remote adapters are displayed in Host view. The HBAnyware utility displays elements in ascending order.

Host View button (default)

- Displays the host system.

Note: You cannot change host names using the HBAnyware utility; names must be changed locally on that system.

- Within each host system, displays the installed adapters.
- Displays adapter ports and the port numbers if available.
- If multiple adapters have the same model number, displays adapters by the WWNN.
- If targets are present, displays the WWPN. Multiple adapters can refer to the same target.
- If LUNs are present, displays the LUN number.
- COMSTAR ports are located on the same level in the discovery-tree as initiator ports, meaning that they branch out from adapters. Unlike initiator ports, however, targets do not branch out from COMSTAR ports.

Fabric View button

- Displays the fabrics in the SAN with their fabric IDs.
- Displays the ports under each switch.
- If targets are present, displays each WWPN. Multiple adapters can refer to the same target.
- If LUNs are present, displays each LUN number.
- If the fabric ID is all zeros, no fabric is attached.

Virtual Ports View button

- Displays virtual ports in the SAN.

Note: The Emulex emlxs driver for Solaris does not support COMSTAR running over virtual ports, so the Virtual Ports view only displays initiator ports.

Local HBAs Only button

- Displays only local adapters.

Help button

- Displays the HBAnyware utility's on-line help.

The Discovery-Tree

The discovery-tree (left pane) has icons that represent discovered hosts, adapters, ports, virtual ports, fabrics, targets and LUNs.

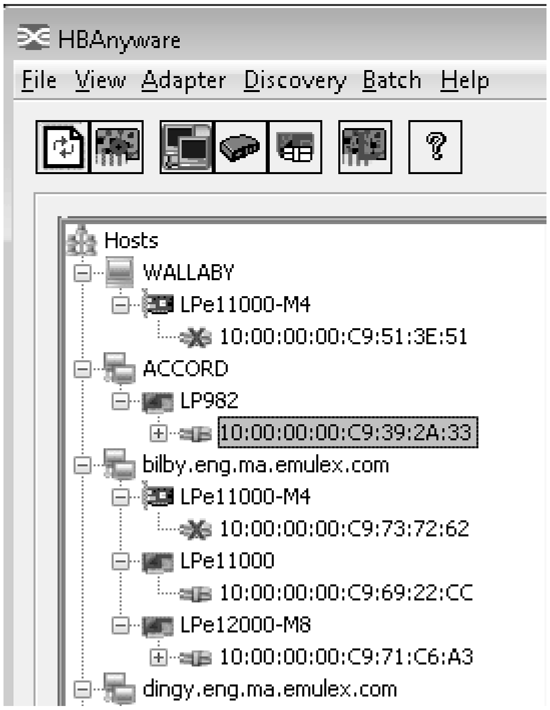


Figure 4: Discovery-tree

Discovery-Tree Icons

Discovery-tree icons represent the following:

The local host.

Other hosts connected to the system.

A green adapter icon with black descriptive text represents an online adapter. Blue text represents an adapter port that had previously been discovered, but currently is not being seen by the discovery engine (service). The adapter will be removed from the discovery-tree if it still is not seen after the undiscovered adapter expiration time (default is 1800 seconds, or 30 minutes). If the adapter is discovered again before the expiration time, it will revert back to normal black text. See “Configuring Discovery, CIM Credentials and TCP/IP Settings” on page 29 for more information about discovery settings.

A gray adapter icon indicates all ports for that adapter are no longer being discovered.

A red icon indicates all ports for the adapter are offline (link down). Several situations could cause the adapter to be offline or inaccessible:

- The adapter on a local host is not connected to the network, but is available for local access.
- The adapter on a local host is malfunctioning and inaccessible to the local host and the network.
- The adapter on a local host is busy performing a local download and is temporarily inaccessible to the local host and the network.

The port icon represents adapter ports. Newer adapters also display the port number.

A port icon with a red X indicates the port is down. If all discovered ports are down, the adapter icon changes to red.

A gray port icon indicates that port is undiscovered. If all the ports are undiscovered, the adapter icon changes to gray.

Note: Multiport adapters are represented in the discovery-tree with separate port icons for each port. Older multiport adapter models (for example. LP8000DC, LP9402DC or LP9002DC) are represented by separate adapter icons.

The Virtual Port icon represents virtual ports.

The Target icon represents connections to individual storage devices.

The COMSTAR icon represents COMSTAR ports. COMSTAR ports are unique in that a single port can be shown simultaneously as both a manageable adapter port and a regular target. When a COMSTAR port is seen as a target, it displays the Target discovery-tree icon and Target dialog box information.

A COMSTAR icon with a red X indicates the port is down.

The LUN icon represents connections to individual disk LUNs.

The Tape LUN icon represents LUNs that are tape devices.

The Target Controller LUN icon represents LUNs that are storage controllers.

The Switch icon represents connections to the switch.

Expanding or Collapsing the Discovery-Tree View

You can also use the Expand/Collapse feature on the View menu to change the way discovered elements are displayed. By selecting one of the four levels the discovery-tree is expanded or collapsed to that level. You can choose Hosts/Fabrics (depending on the view) HBAs, Ports and Targets.

The Property Tabs

The property tabs display configuration, statistical and status information for network elements. The set of available tabs is context-sensitive, depending on the type of network element or adapter port currently selected in the discovery-tree.

The Status Bar

The status bar is located near the bottom of the HBAnyware utility window. The status bar displays messages about certain HBAnyware utility functions, such as “Discovery in progress”.

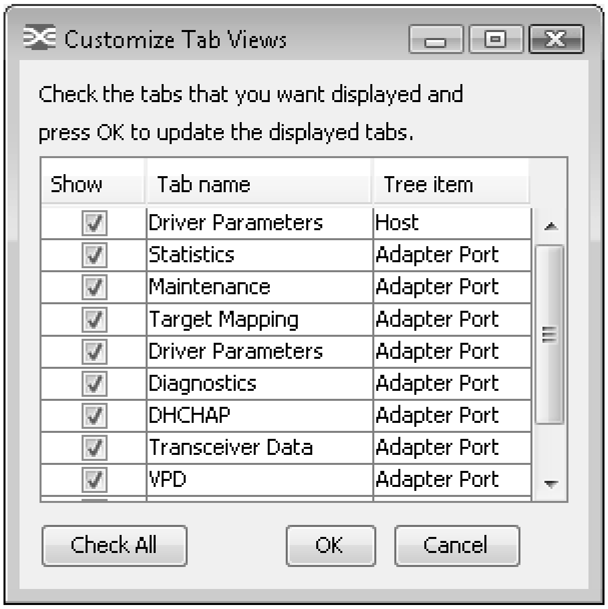
The status bar is visible by default. Use the Status Bar item in the View menu to hide the status bar. If checked, the status bar is visible.

Customizing Tab Views

Using the Customize Tab Views dialog box you can choose whether or not to display certain property tabs. By default, all tabs are displayed.

To customize tab views:

1. From the **View** menu, select **Customize Tabs**. The Customize Tab Views dialog box appears.



Check the tabs that you want displayed and press OK to update the displayed tabs.

Show	Tab name	Tree item
☑	Driver Parameters	Host
☑	Statistics	Adapter Port
☑	Maintenance	Adapter Port
☑	Target Mapping	Adapter Port
☑	Driver Parameters	Adapter Port
☑	Diagnostics	Adapter Port
☑	DHCHAP	Adapter Port
☑	Transceiver Data	Adapter Port
☑	VPD	Adapter Port

Figure 5: Customize Tab Views dialog box

2. Check tabs to display them. Clear tabs to hide them.
3. Click **OK**.

Changing Management and Read-Only Mode

During installation, you selected both a management and a read-only mode. If you also chose to enable modification of these settings after installation, then you can choose three types of host/adapter management:

- Strictly Local Management - This setting only allows management of adapters on this host. Management of HBAs on this host from other hosts is not allowed.
- Local Management Plus - This setting only allows management of adapters on this host, but management of HBAs on this host from another host is possible.
- Full Management - This setting enables you to manage adapters on this host and other hosts that allow it.

If Management Mode was enabled during installation, you can also set read-only mode.

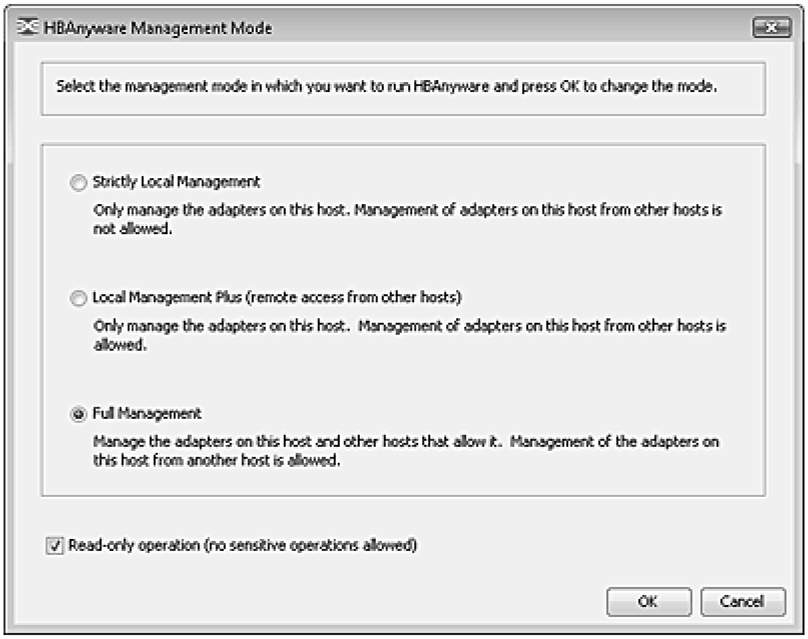
- Read-only mode - This setting prevents performance of certain operations such as resetting adapters, updating the adapter or Converged Enhanced Ethernet (CEE) firmware image and changing adapter driver properties and bindings. Dialog box buttons and menus that pertain to these tasks are completely hidden or inactive.

To change management/read-only mode:

Note: You must restart the HBAnyware utility to see the new management mode.

In Windows:

1. From the **File** menu, select **Management Mode**. The Management Mode dialog box appears.



Select the management mode in which you want to run HBAnyware and press OK to change the mode.

○ Strictly Local Management

Only manage the adapters on this host. Management of adapters on this host from other hosts is not allowed.

○ Local Management Plus (remote access from other hosts)

Only manage the adapters on this host. Management of adapters on this host from other hosts is allowed.

● Full Management

Manage the adapters on this host and other hosts that allow it. Management of the adapters on this host from another host is allowed.

☑ Read-only operation (no sensitive operations allowed)

Figure 6: Management Mode dialog box

2. Choose the management type and read-only mode you want.
3. Click **OK**.

In Solaris SFS:

1. Run the following script:

```
/opt/HBAnyware/set_operating_mode
```

2. Choose the management type and read-only mode you want.

In Linux:

1. Stop the HBAnyware utility.
2. Run the following script:

   ```
   /usr/sbin/hbanyware/set_operating_mode
   ```
3. Choose the management type and read-only mode you want. Enter **<y>** 'for yes to allow the user to perform these operations, enter **<n>** for no if read-only mode is desired.

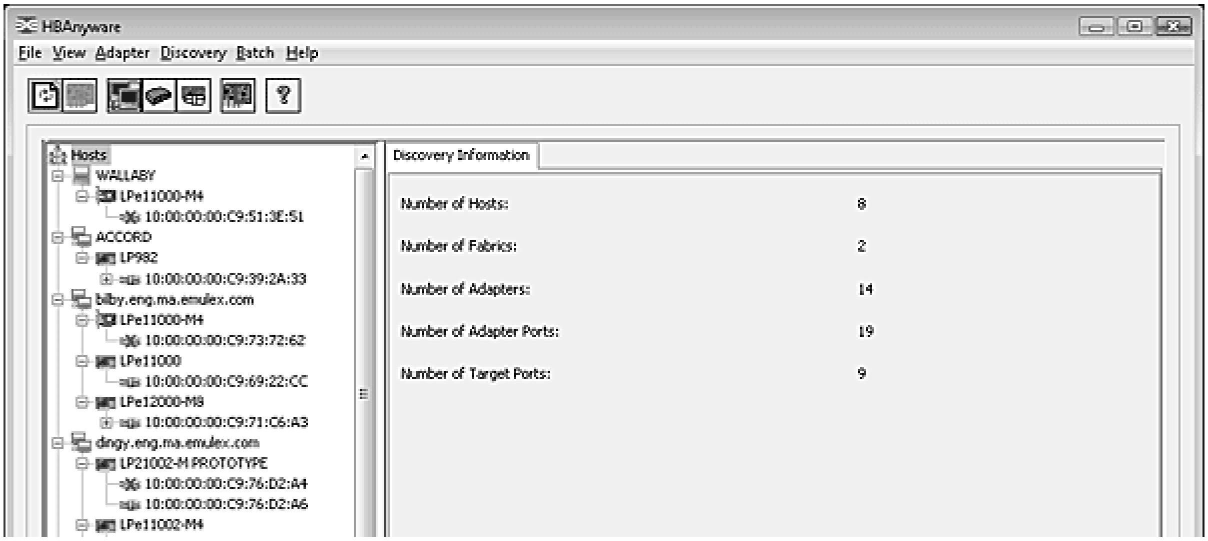
Discovering Adapters

Automatic Fibre Channel Discovery

Adapters that have a physical FC connection to the same SAN are discovered automatically when the HBAnyware utility is launched. Adapters that don't have a physical FC connection to the SAN where the HBAnyware utility is launched can be discovered by sending management requests to a remote host using TCP/IP.

Note: The HBAnyware utility can only discover and manage remote adapters on hosts running the HBAnyware utility’s remote management server. Remote FC capabilities of the HBAnyware utility are subject to fabric zoning and may be reduced if HBAnyware security is being used. Hosts you want to discover and manage using the HBAnyware utility must be in the same zone or discovered and managed through TCP/IP access.

Note: After adding an adapter to a running system (commonly called a hot plug), click **Discovery Refresh** (⟳) or restart the HBAnyware utility to display the new adapter port in the discovery-tree.



```
Hosts
⊟ WALLABY
  ⊟ LPe11000-M4
      10:00:00:00:C9:51:3E:51
⊟ ACCORD
  ⊟ LP982
    ⊞ 10:00:00:00:C9:39:2A:33
⊟ bilby.eng.ma.emulex.com
  ⊟ LPe11000-M4
      10:00:00:00:C9:73:72:62
  ⊟ LPe11000
      10:00:00:00:C9:69:22:CC
  ⊟ LPe12000-M8
    ⊞ 10:00:00:00:C9:71:C6:A3
⊟ dingy.eng.ma.emulex.com
  ⊟ LP21002-M PROTOTYPE
      10:00:00:00:C9:76:D2:A4
      10:00:00:00:C9:76:D2:A6
  ⊟ LPe11002-M4
```

Number of Hosts:	8
Number of Fabrics:	2
Number of Adapters:	14
Number of Adapter Ports:	19
Number of Target Ports:	9

Figure 7: Discovery Information

Remote SAN Management Using TCP/IP Access Protocol

You can discover adapters on TCP/IP hosts and on hosts configured to support the CIM interface. Remote SAN management over TCP/IP sends remote management requests using TCP/IP access protocol to remote hosts. TCP/IP access enables you to access adapters via their host IP-address or by the name of the host on which they reside. Since adapters can exist on a host but not be a part of a FC network, they do not appear during normal FC discovery. Thus, TCP/IP access enlarges the number of adapters that can be queried or modified.

Note: In Windows, if you are running a firewall you may need to add the HBAnyware remote server to the firewall's exception list. This remote server's path is:

```
\Program Files\Emulex\Util\Common\rmserver.exe
```

On 64-bit hosts the path is

```
\Program Files (x86)\Emulex\Util\Common\rmserver.exe
```

The principle differences between FC and TCP/IP access are:

- A TCP/IP host with or without an adapter installed does not need to connect to a fabric to manage other hosts.
- A TCP/IP management host can manage all of the adapters in a remote host, not just the ones connected to the same fabric. FC can only manage adapters connected to the same fabric.
- You can manage many more hosts since TCP/IP access is not constrained by the boundaries of a fabric or zoning.
- True board status (e.g. link down) is available since the FC path is not necessary to send a status request to the remote host.
- Adapter security in a TCP/IP environment is much more important since many more hosts are available for management and TCP/IP access is not affected by fabrics or zoning.
- Discovery of hosts in a TCP/IP environment is not automatic as FC discovery is. You must add the hosts to be managed.

The Hosts File

The TCP/IP discovery portion of the HBAnyware discovery server relies on a file called the hosts file. This plain text file contains a list of hosts the utility will attempt to discover. The discovery server does not attempt to discover hosts over TCP/IP through any other mechanisms (e.g. ping sweeps, broadcasts, etc.).

The hosts file is automatically created or modified when you perform any of the following operations:

- Add a single host from the Add Remote Host window. If the host is discovered, the HBAnyware utility adds its IP address and name to the host file.
- Scan a range or ranges of IP addresses for hosts that can be managed. This is performed in the Add Remote Hosts window. For each discovered host, the HBAnyware utility adds the IP address and name to the host file.
- Remove a host from the host file from the Remove Remote Hosts window. For each removed host, the HBAnyware utility removes that IP address and name from the host file.

Manually Editing the Hosts File

You can open the hosts file with any text editor, modify the contents and save the file. The name of the host file is “hbahosts.lst”. Once the file is modified and saved, the updated file is used after the next TCP/IP discovery cycle is complete. If the discovery server is running, it does not need to be restarted.

To manually edit the hosts file:

1. Locate and open the hosts file.

   Windows: The file is located on the system drive in the directory "\Program Files\Emulex\Util" for 32-bit machines or "\Program Files (x86)\Emulex\Util" for 64-bit machines.

   Solaris: The file is located in the directory "/opt/HBAnyware".

   Linux: The file is located in the directory "/usr/sbin/hbanyware".

2. Edit the file. Guidelines for editing the file are as follows:
   - Each line of the file starts with an IP address. Following the IP address can be any number of tabs or spaces. This is followed by a “#” character, zero or more tabs or spaces and the name of the host for that IP address. The host name is not required for discovery. Its purpose is to make the file more readable and is used by the HBAnyware utility to display the host name in the Remove Remote Hosts window when the host is not discovered. However, the discovery server only needs the IP address to discover the host.
   - Each line in the file can be up to 1023 characters, although this is longer than is needed for a host IP address and host name. A line longer than this is truncated, possibly causing discovery to not discover some of the hosts.
   - Blank lines are ignored.
3. Save the file.

Copying the File

A hosts file on one host can be copied and used on another host. This is useful if there are multiple hosts on the same network running the HBAnyware utility. Once the remote hosts are added to the hosts file on one host, that hosts file can be copied to other hosts so the process to create the hosts file does not need to be repeated.

Note: Due to the line terminator differences between Windows and Solaris or Linux hosts, the files cannot be shared between Windows hosts and Solaris or Linux hosts.

Adding a Single Host

The HBAnyware utility enables you to specify a single TCP/IP host to manage. You can add a Resource Management Application Programming Interface (RMAPI) host or CIM host using the host name or IP address. If the host is successfully discovered it is added to the hosts file. If it has not been discovered over FC already, the host and its adapter ports are added to the discovery-tree. (Not available in read-only mode.)

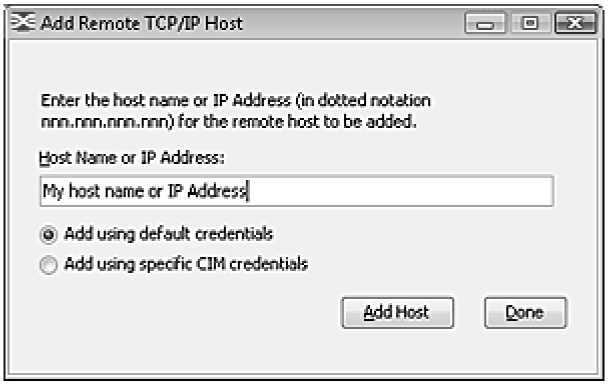
Prerequisites

The HBAnyware utility must be installed on the remote host.

Procedure

To add a single host:

1. From the **Discovery** menu, select **TCP/IP>Add Host**. The Add Remote TCP/IP Host dialog box appears.



Add Remote TCP/IP Host

Enter the host name or IP Address (in dotted notation nnn.nnn.nnn.nnn) for the remote host to be added.

Host Name or IP Address: My host name or IP Address

● Add using default credentials

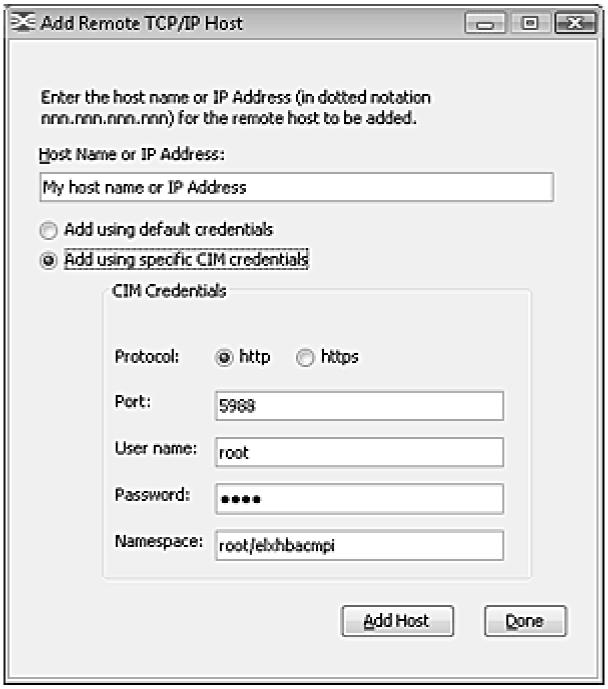
○ Add using specific CIM credentials

Figure 8: Add Remote TCP/IP Host dialog box

2. Enter the name or the IP address of the host to be added.

Note: Entering the IP address to identify the host avoids possible name resolution issues.

3. Configure the discovery method:
   - If you want to add the host using default discovery methods, check **Add using default credentials** and click **Add Host**. You will receive a message indicating whether the new host was successfully added.
   - If you want to add the new host using specific CIM credentials, check **Add using specific CIM credentials** and click **Add Host**. The Add Remote TCP/IP Host dialog box appears with default CIM settings. CIM credentials are most often used when managing VMware ESX 3i or VMware ESX 4i servers.



Enter the host name or IP Address (in dotted notation nnn.nnn.nnn.nnn) for the remote host to be added.

Host Name or IP Address: My host name or IP Address

○ Add using default credentials

● Add using specific CIM credentials

CIM Credentials

Protocol: ● http ○ https

Port: 5988

User name: root

Password: ●●●●

Namespace: root/elxhbacmpi

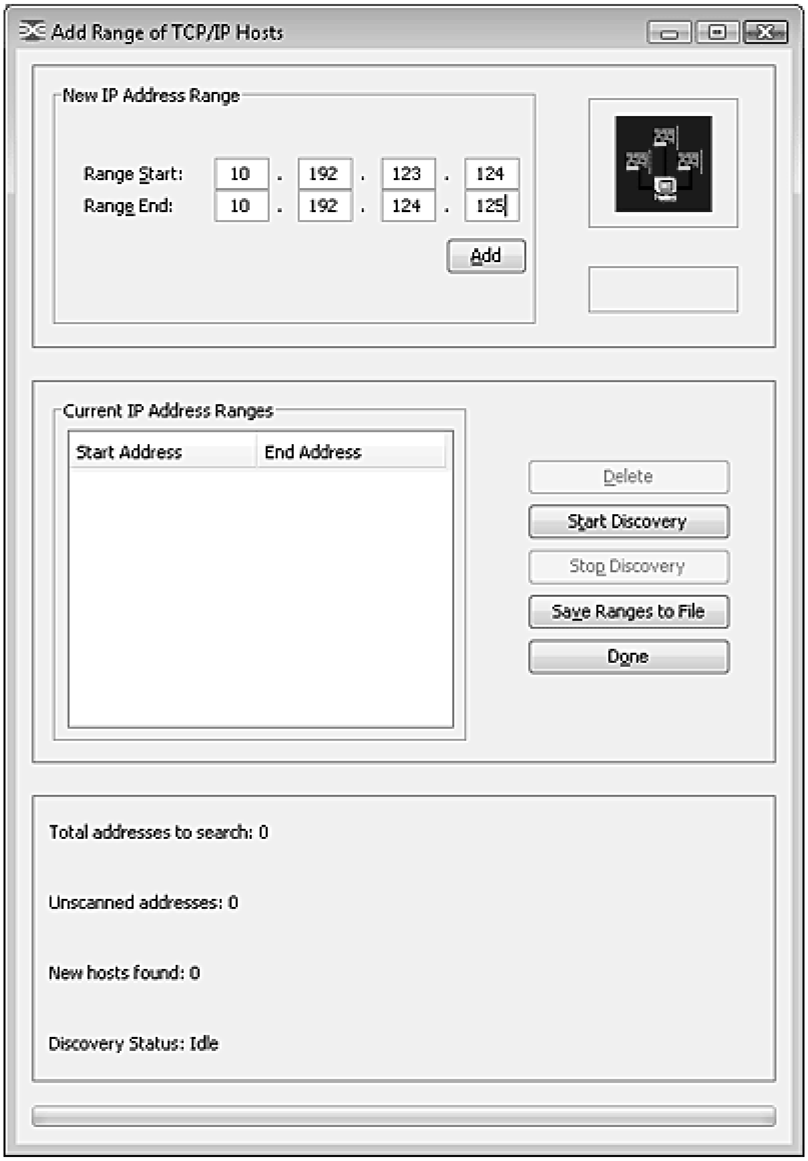
Figure 9: Add Remote TCP/IP Host dialog box with CIM Credentials

a. Edit the default CIM settings if necessary and click **Add Host**. You will receive a message indicating whether the new host was successfully added.

Adding a Range of Hosts

Find the TCP/IP-accessed manageable hosts by searching a range of IP addresses. The Add Range of TCP/IP Hosts dialog box enables you to build the initial list of TCP/IP accessed manageable hosts. (Not available in read-only mode or on Windows XP or Vista.)

Note: The ranges of IP addresses are only scanned each time you open the Add Remote TCP/IP Hosts dialog box and click Start Discovery. The ranges are NOT automatically scanned by the discovery server during its discovery cycles.



Add Range of TCP/IP Hosts
New IP Address Range
Range Start: 10 . 192 . 123 . 124
Range End: 10 . 192 . 124 . 125
Add
Current IP Address Ranges
Start Address
End Address
Delete
Start Discovery
Stop Discovery
Save Ranges to File
Done

Total addresses to search: 0

Unscanned addresses: 0

New hosts found: 0

Discovery Status: Idle

Figure 10: Add Range of TCP/IP Hosts dialog box

Prerequisites

The HBAnyware utility must be installed on all remote hosts.

Procedure

To add a range of remote hosts:

1. From the **Discovery** menu, select **TCP/IP>Add Remote Hosts**. The Add Range of TCP/IP Hosts dialog box appears.
2. Enter the complete start and end address range and click **Add**. The added address range appears in the dialog box. Add any additional ranges you want to search.

3. Click **Start Discovery**. If an address is determined to be remotely manageable, it is added to the list of addresses that the discovery server will attempt to discover. The utility creates a host file if necessary, and checks each address in the range to determine if the host is available and remotely manageable. The number of addresses (of manageable hosts) discovered is periodically updated on the dialog box.

> **Note:** The number of addresses does not correspond directly to the number of hosts added to the discovery-tree.
>
> For example, some of the addresses discovered may be for hosts that have already been discovered over FC. However, new adapters can be discovered on those hosts that were not discovered over FC.
>
> Also, a host can have more than one IP address assigned to it. If multiple IP addresses for a host are discovered during the search, the host will be added to the discovery tree only once.

4. You can save the IP address ranges. Click **Save Ranges to File** to save the specified range(s) to a file so that these address ranges appear the next time you use the Add Range of TCP/IP Hosts dialog box.

Removing Hosts

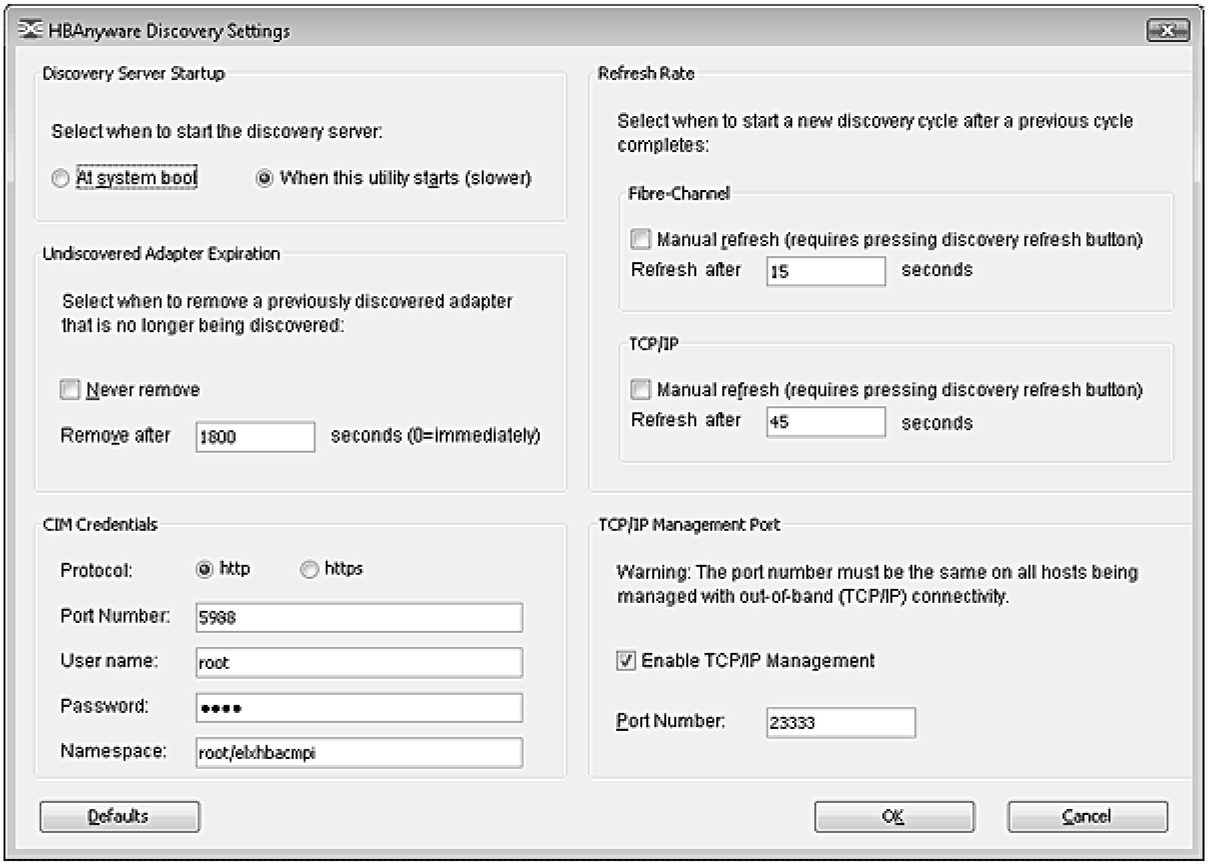
Removing hosts that can no longer be discovered improves the operation of the discovery server. For example, you may want to remove a host when it is removed from the network. (Not available in read-only mode.)

To remove hosts:

1. From the **Discovery** menu, select **TCP/IP>Remove Host(s)**. The Remove Hosts dialog box shows a list of discovered hosts. Any host that is not currently discovered appears in red. Click **Show Undiscovered Hosts Only** to display only currently undiscovered hosts.
2. From the Remove Hosts dialog box, select the hosts you want to remove. You can select all the displayed hosts by clicking **Select All**.
3. Click **Remove** to remove the selected hosts.

Configuring Discovery, CIM Credentials and TCP/IP Settings

Use the HBAnyware Discovery Settings dialog box to configure several discovery server parameters. You can define when to start the discovery server, when to refresh FC and TCP/IP accessed discoveries and when to remove previously discovered HBAs that are no longer being discovered. You can also define default CIM credentials such as the protocol, user name, port number, password and name space. For TCP/IP management, you can specify an IP port number, change an IP port number and enable a port for TCP/IP management.



HBAnyware Discovery Settings

Discovery Server Startup

Select when to start the discovery server:

○ At system boot ● When this utility starts (slower)

Undiscovered Adapter Expiration

Select when to remove a previously discovered adapter that is no longer being discovered:

□ Never remove

Remove after 1800 seconds (0=immediately)

CIM Credentials

Protocol: ● http ○ https

Port Number: 5988

User name: root

Password: ••••

Namespace: root/elxhbacmpi

Refresh Rate

Select when to start a new discovery cycle after a previous cycle completes:

Fibre-Channel

□ Manual refresh (requires pressing discovery refresh button)

Refresh after 15 seconds

TCP/IP

□ Manual refresh (requires pressing discovery refresh button)

Refresh after 45 seconds

TCP/IP Management Port

Warning: The port number must be the same on all hosts being managed with out-of-band (TCP/IP) connectivity.

☑ Enable TCP/IP Management

Port Number: 23333

Figure 11: HBAnyware Discovery Settings dialog box

To configure discovery settings:

1. From the **Discovery** menu, select **Modify Settings**. The HBAnyware Discovery Settings dialog box appears.
2. Define the discovery properties you want.
3. If TCP/IP Management is enabled, the Enable TCP/IP Management checkbox is selected and the current port number is displayed in the Port Number field. If desired, enter a different port number (between 1024 and 65535). Click **Defaults** to select the Enable TCP/IP Management checkbox (if unchecked) and set the port number to 23333.

   If the port number or the Enable TCP/IP Management checkbox is changed, a set of warning messages may appear before changes are made. Click **Yes** on the warning message to continue with the change.

Caution: The IP port number must be the same for all hosts that are to be managed. Setting an IP port number for one host to a different value than the other hosts will make the host unable to manage other hosts over TCP/IP, as well as make the host unmanageable over TCP/IP from other hosts.

4. If the IP port number is changed, the utility restarts the HBAnyware discovery server and management agent to use the new settings. If the servers cannot be stopped and restarted, you are prompted to reboot the host for the new TCP/IP management settings to take effect.
5. If you want, edit the CIM credentials.

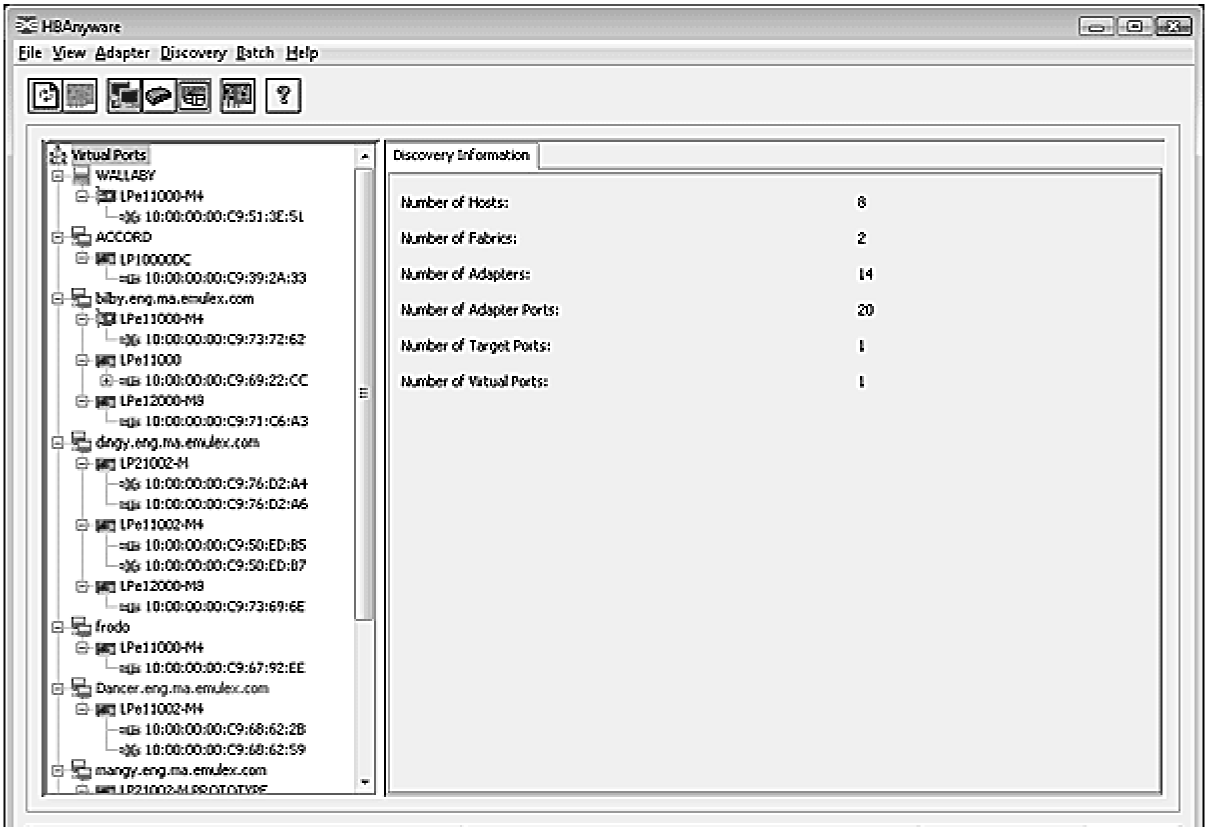
6. Click **OK** to apply your changes. Click **Defaults** to return the discovery properties to their default settings.

Viewing Discovery Information

The Discovery Information page contains a general summary of the discovered elements. The Host, Fabric or Virtual Port icon, depending upon which view you select, is the root of the discovery-tree, but it does not represent a specific network element. Expanding it reveals all hosts, LUNs, targets, adapters ports and virtual ports that are visible on the SAN.

To view the discovery information:

1. Click the **Hosts, Fabrics** or **Virtual Port** icon at the root of the discovery-tree. Discovered SAN elements appear in the discovery-tree.
2. Select an element from the discovery-tree to learn more about it.



```
Virtual Ports
  WALLABY
    LPe11000-M4
      10:00:00:00:C9:51:3E:5L
  ACCORD
    LP10000DC
      10:00:00:00:C9:39:2A:33
  bilby.eng.ma.emulex.com
    LPe11000-M4
      10:00:00:00:C9:73:72:62
    LPe11000
      10:00:00:00:C9:69:22:CC
    LPe12000-M8
      10:00:00:00:C9:71:C6:A3
  dingy.eng.ma.emulex.com
    LP21002-H
      10:00:00:00:C9:76:D2:A4
      10:00:00:00:C9:76:D2:A6
    LPe11002-M4
      10:00:00:00:C9:50:ED:B5
      10:00:00:00:C9:50:ED:B7
    LPe12000-M8
      10:00:00:00:C9:73:69:6E
  frodo
    LPe11000-M4
      10:00:00:00:C9:67:92:EE
  Dancer.eng.ma.emulex.com
    LPe11002-M4
      10:00:00:00:C9:68:62:2B
      10:00:00:00:C9:68:62:59
  mangy.eng.ma.emulex.com
    LP21002-M PROTOTYPE
```

Number of Hosts:	8
Number of Fabrics:	2
Number of Adapters:	14
Number of Adapter Ports:	20
Number of Target Ports:	1
Number of Virtual Ports:	1

Figure 12: Discovery Information (Virtual Port view selected)

Discovery Information Field Definitions

- Number of Hosts - The total number of discovered host computers. This includes servers, workstations, personal computers, multiprocessor systems and clustered computer complexes.
- Number of Fabrics - The total number of discovered fabrics.
- Number of Adapters - The total number of discovered adapters.
- Number of Adapter Ports - The number of discovered adapter ports on this host that can be managed by this host.
- Number of Target Ports - The total number of unique discovered targets on the SAN. In the discovery-tree, the same target can appear under more than one adapter.

- Number of Virtual Ports - The number of discovered virtual ports on this host that can be managed by this host. (Only displayed if the Virtual Ports element is selected in the discovery-tree.)

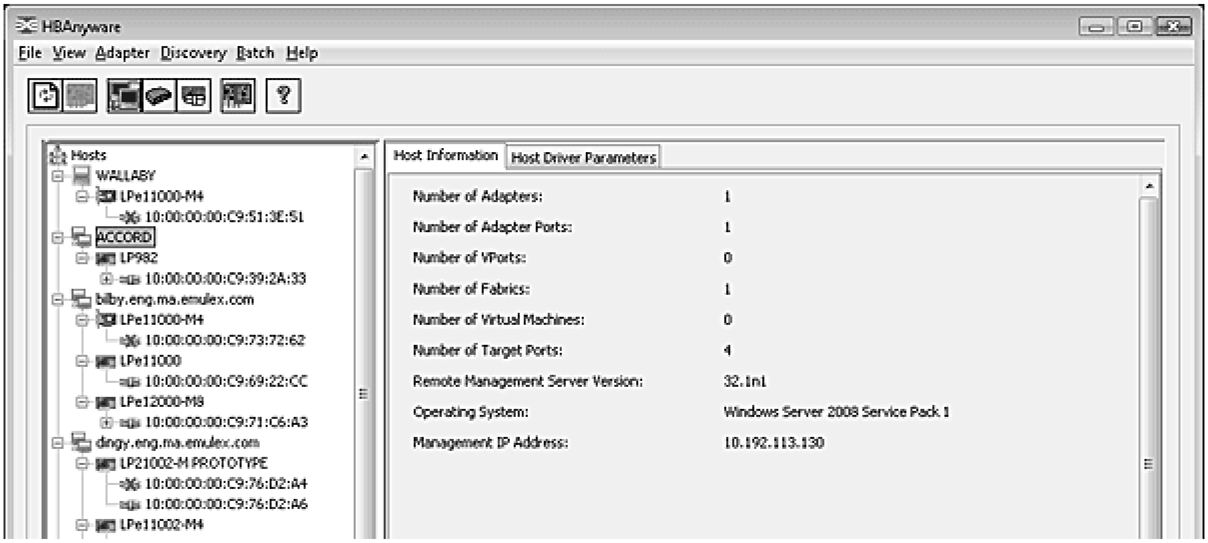
Viewing Host Information

There are two tabs that show host information: the Host Information tab and the Host Driver Parameters tab. The Host Information tab is read-only. The Host Driver Parameters tab enables you to view and define adapter driver settings for a specific host. See “The Host Driver Parameters Tab” on page 50 for more information about the Host Driver Parameters tab.

To view the Host Information and Host Driver Parameters tabs:

1. Do one of the following:
   - From **View** menu, click **Hosts**.
   - From the toolbar, click **Host View**.
2. Select a host in the discovery-tree.
3. Select the **Host Information** tab or the **Host Driver Parameters** tab.

The Host Information tab displays information for the selected host including the number of adapters installed in the selected host, the number of fabrics to which it is connected and so on.



Number of Adapters: 1
Number of Adapter Ports: 1
Number of VPorts: 0
Number of Fabrics: 1
Number of Virtual Machines: 0
Number of Target Ports: 4
Remote Management Server Version: 32.1n1
Operating System: Windows Server 2008 Service Pack 1
Management IP Address: 10.192.113.130

Figure 13: Host Information tab

Host Information Field Definitions

- Number of Adapters - The number of adapters installed in the host.
- Number of Adapter Ports - The number of discovered adapter ports on this host that can be managed by this host.
- Number of VPorts - The number of discovered virtual ports that can be managed by this host. (Not supported on VMware ESX servers being managed through the CIM interface.)
- Number of Fabrics - The number of fabrics to which this host is attached. (Not supported on VMware ESX servers being managed through the CIM interface.)
- Number of Virtual Machines - The number of virtual machines that can be seen by this host. (Not supported on VMware ESX servers being managed through the CIM interface.)

- Number of Target Ports - The number of storage devices seen by the host.
- Remote Manager Server Version - The version of the HBAnyware utility server that is running on the host. If different versions of the HBAnyware utility are installed on different hosts in the SAN, those differences appear in this field.
- Operating System - The operating system and version installed on the selected host.
- Management IP Address - If the host is discovered with FC, the Management IP Address field displays “Host discovered over Fibre Channel”. If the host has been added with TCP/IP access, the Management IP Address field displays the host's IP address, for example, 138.239.82.131. "Local Host" is displayed if you selected the host you are actually launching from.
- CIM Provider Version - If the host is being managed using the CIM interface, the "CIM Provider Version" field will display the version of the Emulex CIM provider that is running on the remotely managed system.

Note: The CIM Provider Version field only appears if the host is managed through the CIM interface.

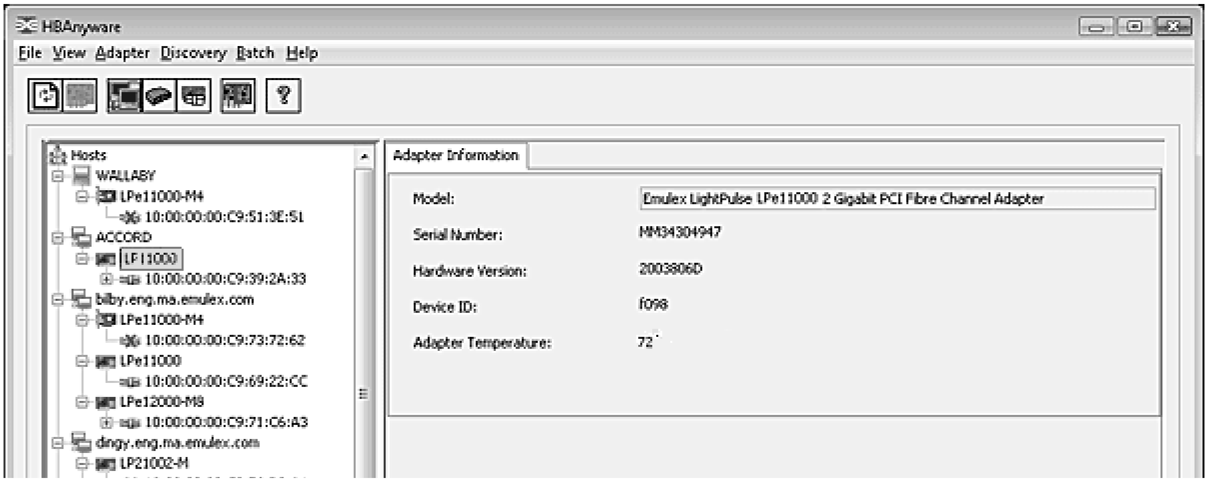
Viewing Adapter Information

The Adapter Information tab contains general attributes associated with the selected adapter.

Note: Not all information is displayed on systems using CIM provider v1.2.1 on ESX 3i.

To view general adapter information:

1. Select **Host View** or **Virtual Ports View**.
2. Select an adapter in the discovery-tree.



Model: Emulex LightPulse LPe11000 2 Gigabit PCI Fibre Channel Adapter

Serial Number: MM34304947

Hardware Version: 2003806D

Device ID: f098

Adapter Temperature: 72

Figure 14: Adapter Information tab

Adapter Information Field Definitions

- Model - The complete model name of the adapter.
- Serial Number - The manufacturer's serial number for the selected adapter.
- Hardware Version - The board Joint Electron Devices Engineering Council identification (JEDEC ID) ID version for the selected adapter.
- Device ID - The default device ID for the selected adapter. (Not supported on VMware ESX servers being managed through the CIM interface.)

- Adapter Temperature - If the adapter's temperature is not available, “Not Supported” is displayed. (Not supported on VMware ESX servers being managed through the CIM interface.) If supported by the adapter, this field displays the adapter's temperature and one of the following temperature-related status messages:
  - Normal: The adapter’s temperature is within normal operational range.
  - Exceeded operational range - Critical: The adapter’s temperature is beyond normal operational range. If the temperature continues to increase, the adapter shuts down. You must determine the cause of the temperature problem and fix it immediately. Check for system cooling issues. Common causes of system cooling issues include clogged air filters, inoperable fans and air conditioning problems that cause high ambient air temperatures.
  - Exceeded operational range - Adapter stopped: The temperature has reached critical limit, forcing the adapter to shut down. You must determine the cause of the temperature problem and fix it before resuming operation. Check for system cooling issues. Common causes of system cooling issues include clogged air filters, inoperable fans and air conditioning problems that cause high ambient air temperatures.

    After the system overheating issue is resolved and the adapter has cooled down, reboot the system or, if the system supports hot swapping, cycle the power of the adapter slot.

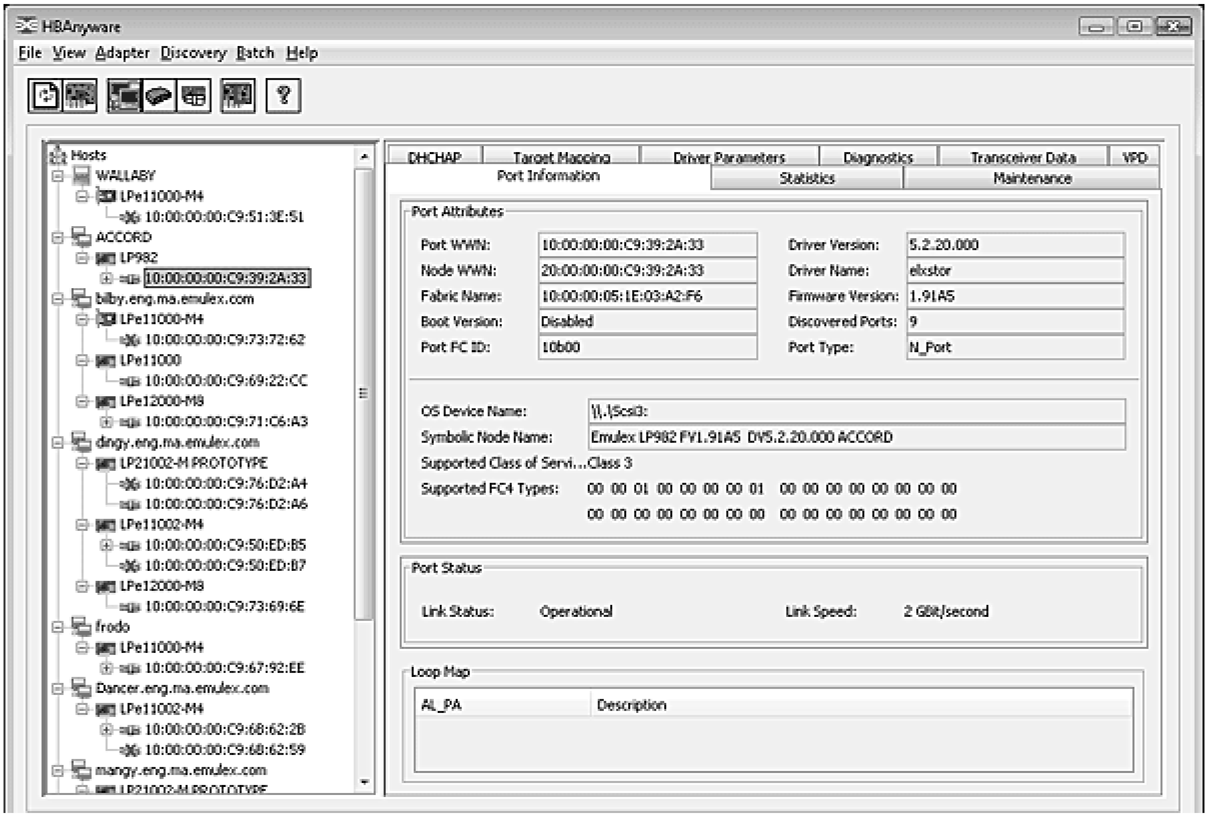
Viewing Port Information

The Port Information tab contains detailed information associated with the selected adapter port.

Note: Not all information is displayed on systems using CIM provider v1.2.1 on ESX 3i.

To view port information:

1. Select **Host View** or **Fabric View**.
2. Select an adapter port in the discovery-tree.
3. Select the **Port Information** tab.



Port Attributes

Port WWN: 10:00:00:00:C9:39:2A:33
Node WWN: 20:00:00:00:C9:39:2A:33
Fabric Name: 10:00:00:05:1E:03:A2:F6
Boot Version: Disabled
Port FC ID: 10b00
Driver Version: 5.2.20.000
Driver Name: elxstor
Firmware Version: 1.91A5
Discovered Ports: 9
Port Type: N_Port

OS Device Name: \\.\Scsi3:
Symbolic Node Name: Emulex LP982 FV1.91A5 DV5.2.20.000 ACCORD
Supported Class of Servi...Class 3
Supported FC4 Types: 00 00 01 00 00 00 00 01 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Port Status

Link Status: Operational
Link Speed: 2 GBit/second

Loop Map

AL_PA	Description

Figure 15: Port Information tab

Port Attributes Area Field Definitions

- Port WWN - The Port World Wide Name of the adapter.
- Node WWN - The Node World Wide Name of the selected adapter.
- Fabric Name or Host Name - The Fabric Name field is displayed in Host view. This is a 64-bit worldwide unique identifier assigned to the fabric. The Host Name is displayed in Fabric view. The host name is the name of the host containing the adapter. (Not supported on VMware ESX servers being managed through the CIM interface.)
- Boot Version - The version of boot code installed on the selected adapter port. If the boot code is disabled, the field displays ”Disabled”.
- Port FC ID - The Fibre Channel ID for the selected adapter port.
- Driver Version - The version of the driver installed for the adapter.
- Driver Name - The executable file image name for the driver as it appears in the Emulex driver download package.
- Firmware Version - The version of Emulex firmware currently active on the adapter port.
- Discovered Ports - The number of mapped and unmapped ports found during discovery by the Emulex adapter driver. The mapped ports are targets and the unmapped ports are non-targets such as switches or adapters.
- Port Type - The current operational mode of the selected adapter’s port.
- OS Device Name - The platform-specific name by which the selected adapters is known to the operating system. (Not supported on VMware ESX servers being managed through the CIM interface.)

- Symbolic Node Name - The FC name used to register the driver with the name server.
- Supported Class of Service - A frame delivery scheme exhibiting a set of delivery characteristics and attributes. There are three classes of service.
    - Class-1 provides a dedicated connection between a pair of ports with confirmed delivery or notification of non-delivery.
    - Class-2 provides a frame switched service with confirmed delivery or notification of non-delivery.
    - Class-3 provides a frame switched service similar to Class-2 but without notification of frame delivery or non-delivery.
- Supported FC4 Types - A 256-bit (8-word) map of the FC-4 protocol types supported by the port containing the selected adapter.

Port Status Area Field Definitions

- Link Status - The status of the link on the selected adapter port.
- Link Speed - The current link speed of the selected adapter port.

Loop Map Table Definitions

- The loop map shows the different ports present in the loop, and is present only if the port (adapter) is operating in loop mode. The simplest example would be to connect a JBOD directly to an adapter. When this is done, the port type is a private loop, and the loop map has an entry for the adapter, and one entry for each of the disks in the JBOD. (Not supported on VMware ESX servers being managed through the CIM interface. Not supported for COMSTAR ports.)

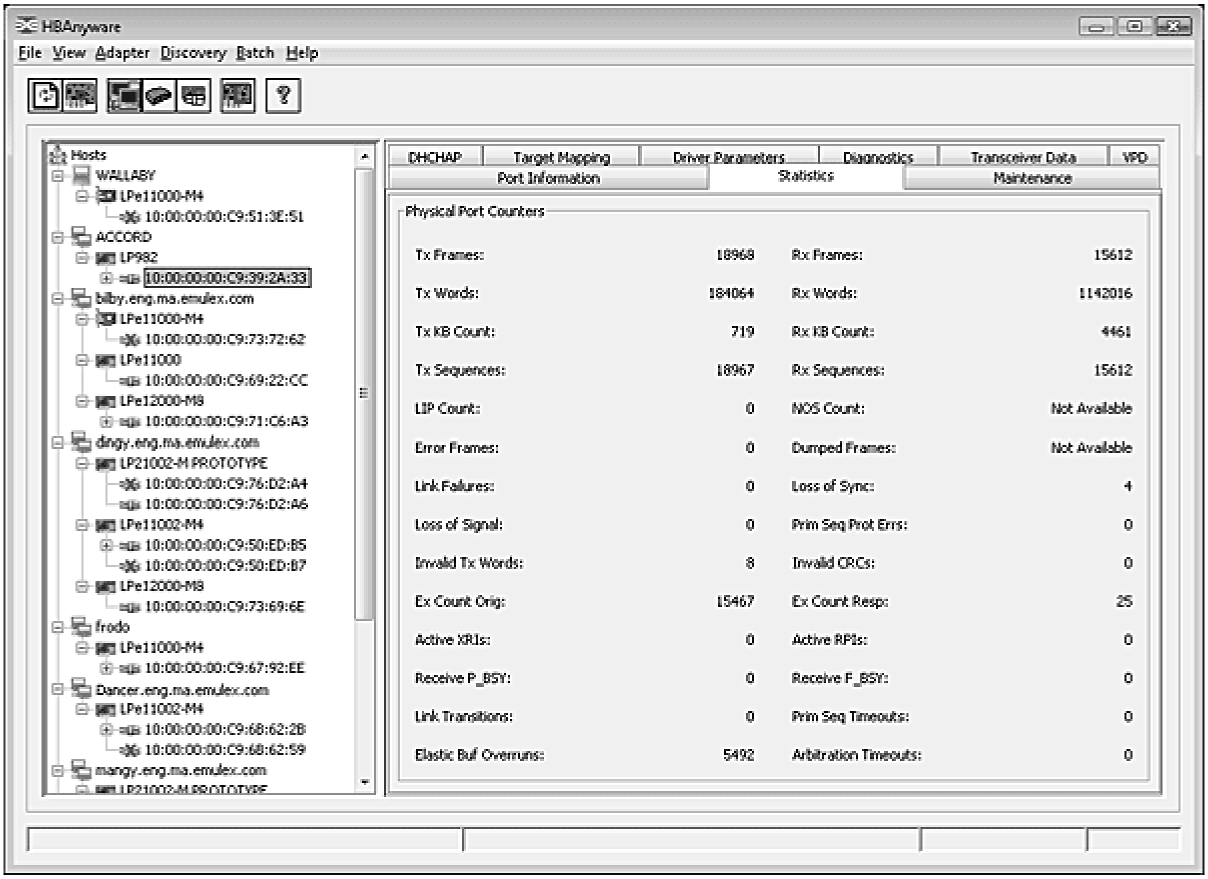
Viewing Port Statistics

The Statistics tab provides cumulative totals for various error events and statistics on the port. Some statistics are cleared when the adapter is reset.

Note: Not all information is displayed on systems using CIM provider v1.2.1 on ESX 3i.

To view port statistics:

1. Select **Host View** or **Fabric View**.
2. Select an adapter port in the discovery-tree.
3. Click the **Statistics** tab.



Physical Port Counters

Tx Frames:	18968	Rx Frames:	15612
Tx Words:	184064	Rx Words:	1142016
Tx KB Count:	719	Rx KB Count:	4461
Tx Sequences:	18967	Rx Sequences:	15612
LIP Count:	0	NOS Count:	Not Available
Error Frames:	0	Dumped Frames:	Not Available
Link Failures:	0	Loss of Sync:	4
Loss of Signal:	0	Prim Seq Prot Errs:	0
Invalid Tx Words:	8	Invalid CRCs:	0
Ex Count Orig:	15467	Ex Count Resp:	25
Active XRIs:	0	Active RPIs:	0
Receive P_BSY:	0	Receive F_BSY:	0
Link Transitions:	0	Prim Seq Timeouts:	0
Elastic Buf Overruns:	5492	Arbitration Timeouts:	0

Figure 16: Statistics tab

Port Statistics Field Definitions

- Tx Frames - FC frames transmitted by this adapter port.
- Tx Words - FC words transmitted by this adapter port.
- Tx KB Count - FC kilobytes transmitted by this adapter port.
- Tx Sequences - FC sequences transmitted by this adapter port.
- LIP count - The number of loop initialization primitive (LIP) events that have occurred for the port. This field is not supported if the topology is not arbitrated loop. Loop initialization consists of the following:
    - Temporarily suspending loop operations.

  - Determining whether loop capable ports are connected to the loop.
  - Assigning AL_PA IDs.
  - Providing notification of configuration changes and loop failures.
  - Placing loop ports in the monitoring state.
- Error Frames - The number of frames received with cyclic redundancy check (CRC) errors.
- Link Failures - The number of times the link has failed. A link failure is a possible cause of a timeout.
- Loss of Signal - The number of times the signal was lost.
- Invalid Tx Words - The total number of invalid words transmitted by this adapter port.
- Ex Count Orig - The number of FC exchanges originating on this port. (Not supported on VMware ESX servers being managed through the CIM interface.)
- Active XRIs - The number of active exchange resource indicators. (Not supported on VMware based ESX platforms using the CIM interface.)
- Received P_BSY - The number of FC port-busy link response frames received.
- Link Transitions - The number of times the SLI port sent a link attention condition.
- Elastic Buf Overruns - The number of times the link interface has had its elastic buffer overrun.
- Rx Frames - The number of FC frames received by this adapter port.
- Rx Words - The number of FC words received by this adapter port.
- Rx KB Count - The received kilobyte count by this adapter port.
- Rx Sequences - The number of FC sequences received by this adapter port. (Not supported on VMware ESX servers being managed through the CIM interface.)
- NOS count - The number of NOS events that have occurred on the switched fabric. Note: This statistic is currently not supported for the SCSIport Miniport and Storport Miniport drivers, nor is it supported for arbitrated loop.
- Dumped Frames - The number of frames that were lost due to a lack of host buffers available. Note: This statistic is not currently supported for the SCSIport Miniport driver, the Storport Miniport driver or the driver for Solaris.
- Loss of Sync - The number of times loss of synchronization has occurred.
- Prim Seq Prot Errs - The primitive sequence protocol error count. This counter is incremented whenever there is any type of protocol error.
- Invalid CRCs - The number of frames received that contain CRC failures.
- Ex Count Resp - The number of FC exchange responses made by this port. (Not supported on VMware ESX servers being managed through the CIM interface.)
- Active RPIs - The number of remote port indicators. (Not supported on VMware ESX servers being managed through the CIM interface.)
- Receive F_BSY - The number of FC port-busy link response frames received.
- Primitive Seq Timeouts - The number of times a primitive sequence event timed out. (Not supported on VMware ESX servers being managed through the CIM interface.)
- Arbitration Timeouts - The number of times the arbitration loop has timed out. Large counts could indicate a malfunction somewhere in the loop or heavy usage of the loop. (Not supported on VMware ESX servers being managed through the CIM interface.)

If you selected a COMSTAR port, the following information is also displayed:

- SCSI Write I/O Count - The number of SCSI Write I/O requests received.
- SCSI Write KB Count - The total number of kilobytes written.

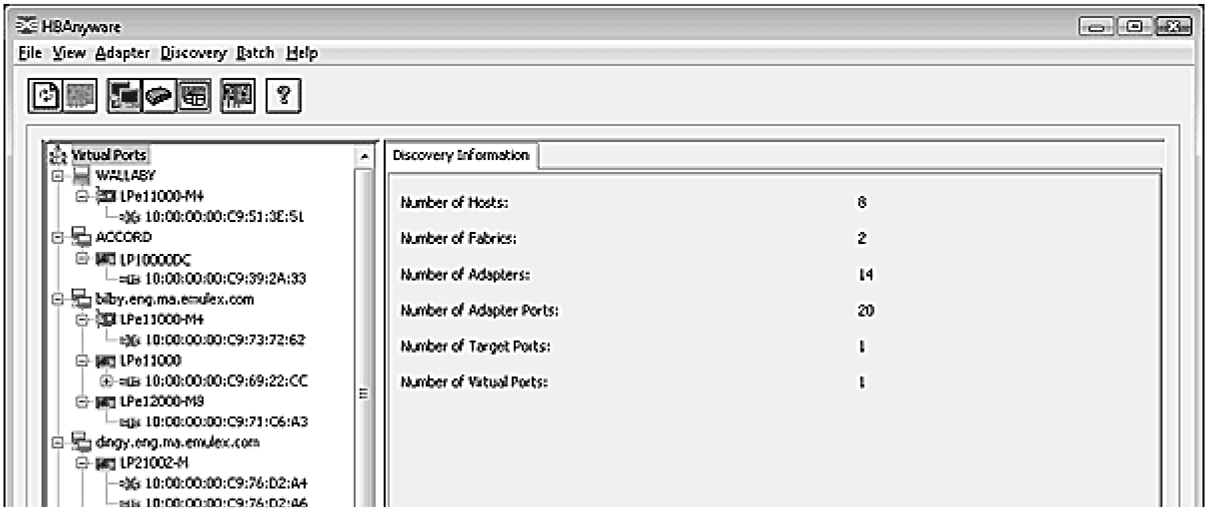
- Total SCSI I/O Count - The number of SCSI I/O requests received.
- No Receive Buffer Count - The number of SCSI I/O requests that were dropped.
- Queue Depth Overflow Count - The number of SCSI I/O requests received after a QFULL condition.
- Dropped SCSI I/O Count - The number of dropped SCSI I/O operations.
- Aborted SCSI I/O Count - The number of aborted SCSI I/O operations.
- Outstanding SCSI I/O Count - The number of SCSI I/O requests currently pending.
- SCSI Read I/O Count - The number of SCSI Read I/O requests received.
- SCSI Read KB Count - The total number of kilobytes read.
- SCSI Status Errors - The number of SCSI status errors sent to the initiator.
- SCSI Queue Full Errors - The number of QFULL errors sent to the initiator.
- SCSI Sense Errors - The number of of times sense data was sent to the initiator.
- SCSI Residual Over - The number of residual overruns returned to the initiator.
- SCSI Residual Under - The number of residual underruns returned to the initiator.

Viewing Virtual Port Information

Use the Virtual Ports tab to view information about virtual ports and their associated targets and LUNs.

To view virtual port information:

1. Do one of the following:
    - From the **View** menu, select **Virtual Ports**.
    - From the toolbar, click **Virtual Ports View**.



Number of Hosts: 8

Number of Fabrics: 2

Number of Adapters: 14

Number of Adapter Ports: 20

Number of Target Ports: 1

Number of Virtual Ports: 1

Figure 17: Virtual Ports Information

Virtual Port Information Field Definitions

- Number of Hosts - The total number of hosts discovered in the SAN.
- Number of Fabrics - The total number of fabrics discovered in the SAN.
- Number of Adapters - The total number of adapters discovered in the SAN.
- Number of Adapter Ports - The total number of adapter ports discovered in the SAN.

- Number of Target Ports - The total number of target ports discovered in the SAN.
- Number of Virtual Ports - The total number of virtual ports discovered in the SAN.

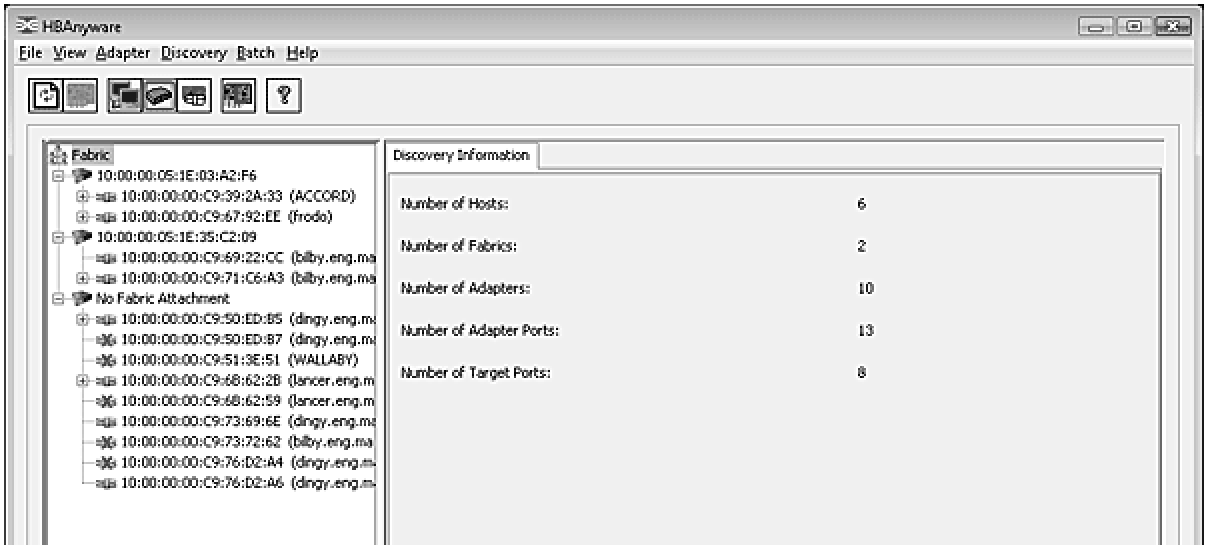
Viewing Fabric Information

The Discovery Information tab contains information about the selected fabric.

To view fabric discovery information:

1. Do one of the following:
    - From the **View** menu, select **Fabric**.
    - From the toolbar, click **Fabric View.**

    The Discovery Information tab shows information about the fabric.



```
Fabric
  10:00:00:05:1E:03:A2:F6
    10:00:00:00:C9:39:2A:33 (ACCORD)
    10:00:00:00:C9:67:92:EE (frodo)
  10:00:00:05:1E:35:C2:09
    10:00:00:00:C9:69:22:CC (bilby.eng.ma
    10:00:00:00:C9:71:C6:A3 (bilby.eng.ma
  No Fabric Attachment
    10:00:00:00:C9:50:ED:B5 (dingy.eng.m
    10:00:00:00:C9:50:ED:B7 (dingy.eng.m
    10:00:00:00:C9:51:3E:51 (WALLABY)
    10:00:00:00:C9:68:62:2B (lancer.eng.m
    10:00:00:00:C9:68:62:59 (lancer.eng.m
    10:00:00:00:C9:73:69:6E (dingy.eng.m
    10:00:00:00:C9:73:72:62 (bilby.eng.ma
    10:00:00:00:C9:76:D2:A4 (dingy.eng.m
    10:00:00:00:C9:76:D2:A6 (dingy.eng.m
```

Number of Hosts:	6
Number of Fabrics:	2
Number of Adapters:	10
Number of Adapter Ports:	13
Number of Target Ports:	8

Figure 18: Fabric Discovery Information

Discovery Information Field Definitions

- Number of Hosts - The number of hosts discovered or seen by this host on the selected fabric.
- Number of Fabrics - The number fabrics identified during discovery.
- Number of Adapters - The number of adapters discovered by this host on the selected fabric.
- Number of Adapter Ports - The number of discovered adapter ports on this host that can be managed by this host.
- Number of Target Ports - The number of storage devices seen by this host on the selected fabric.

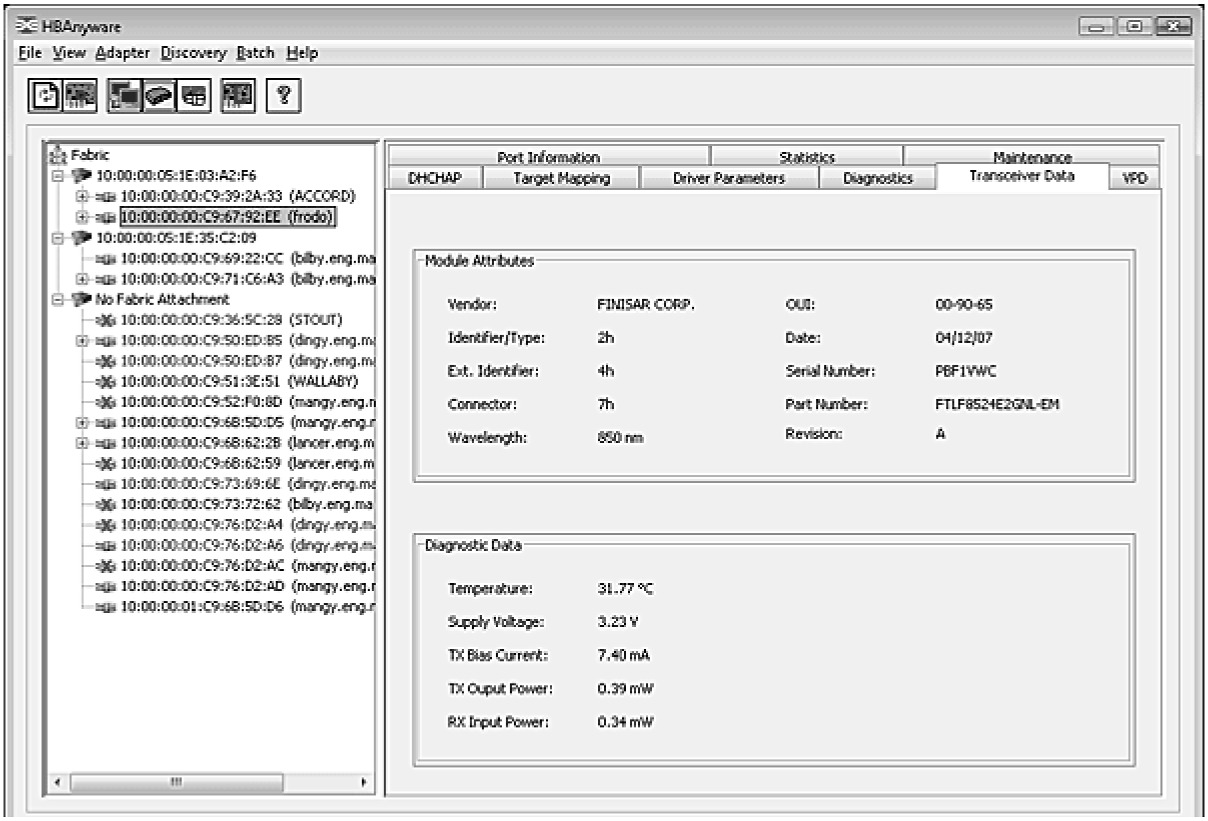
Viewing Transceiver Information

The Transceiver Data tab enables you to view transceiver information such as vendor name, serial number, part number and so on. If the adapter does not support this feature the fields display N/A.

Note: Not supported on systems using CIM provider v1.2.1 on ESX 3i.

To view transceiver information:

1. Select **Host View** or **Fabric View**.
2. In the discovery tree, select the port whose transceiver information you want to view.
3. Select the **Transceiver Data** tab.


HBAnyware
File View Adapter Discovery Batch Help
Fabric
10:00:00:05:1E:03:A2:F6
10:00:00:00:C9:39:2A:33 (ACCORD)
10:00:00:00:C9:67:92:EE (frodo)
10:00:00:05:1E:35:C2:09
10:00:00:00:C9:69:22:CC (bilby.eng.ma
10:00:00:00:C9:71:C6:A3 (bilby.eng.ma
No Fabric Attachment
10:00:00:00:C9:36:5C:28 (STOUT)
10:00:00:00:C9:50:ED:85 (dingy.eng.m
10:00:00:00:C9:50:ED:87 (dingy.eng.m
10:00:00:00:C9:51:3E:51 (WALLABY)
10:00:00:00:C9:52:F0:8D (mangy.eng.n
10:00:00:00:C9:68:5D:D5 (mangy.eng.r
10:00:00:00:C9:68:62:28 (lancer.eng.m
10:00:00:00:C9:68:62:59 (lancer.eng.m
10:00:00:00:C9:73:69:6E (dingy.eng.m
10:00:00:00:C9:73:72:62 (bilby.eng.ma
10:00:00:00:C9:76:D2:A4 (dingy.eng.m
10:00:00:00:C9:76:D2:A6 (dingy.eng.m
10:00:00:00:C9:76:D2:AC (mangy.eng.r
10:00:00:00:C9:76:D2:AD (mangy.eng.r
10:00:00:01:C9:68:5D:D6 (mangy.eng.r
Port Information
Statistics
Maintenance
DHCHAP
Target Mapping
Driver Parameters
Diagnostics
Transceiver Data
VPD

Module Attributes

Vendor:	FINISAR CORP.	OUI:	00-90-65
Identifier/Type:	2h	Date:	04/12/07
Ext. Identifier:	4h	Serial Number:	PBF1VWC
Connector:	7h	Part Number:	FTLF8524E2GNL-EM
Wavelength:	850 nm	Revision:	A

Diagnostic Data

Temperature:	31.77 °C
Supply Voltage:	3.23 V
TX Bias Current:	7.40 mA
TX Ouput Power:	0.39 mW
RX Input Power:	0.34 mW

Figure 19: Transceiver Data tab

Transceiver Information Field Definitions

Module Attributes Area

- Vendor - The name of the vendor.
- Identifier/Type - The identifier value that specifies the physical device described by the serial information.
- Ext. Identifier - Displays additional information about the transceiver.
- Connector - The external optical or electrical cable connector provided as the media interface.
- Wavelength - The nominal transmitter output wavelength at room temperature.
- OUI - Displays the vendor Organizationally Unique Identifier. It is also known as the IEEE Company Identifier for the vendor.
- Date - The vendor’s date code in the MM/DD/YY format.

- Serial Number - The serial number provided by the vendor.
- Part Number - The part number provided by the SFP vendor.
- Revision - The vendor revision level.

Diagnostic Data Area

- Temperature - The internally measured module temperature.
- Supply Voltage - The internally measured supply voltage in the transceiver.
- TX Bias Current - The internally measured TX bias current.
- TX Output Power - The measured TX output power
- RX Output Power - The measured RX output power.

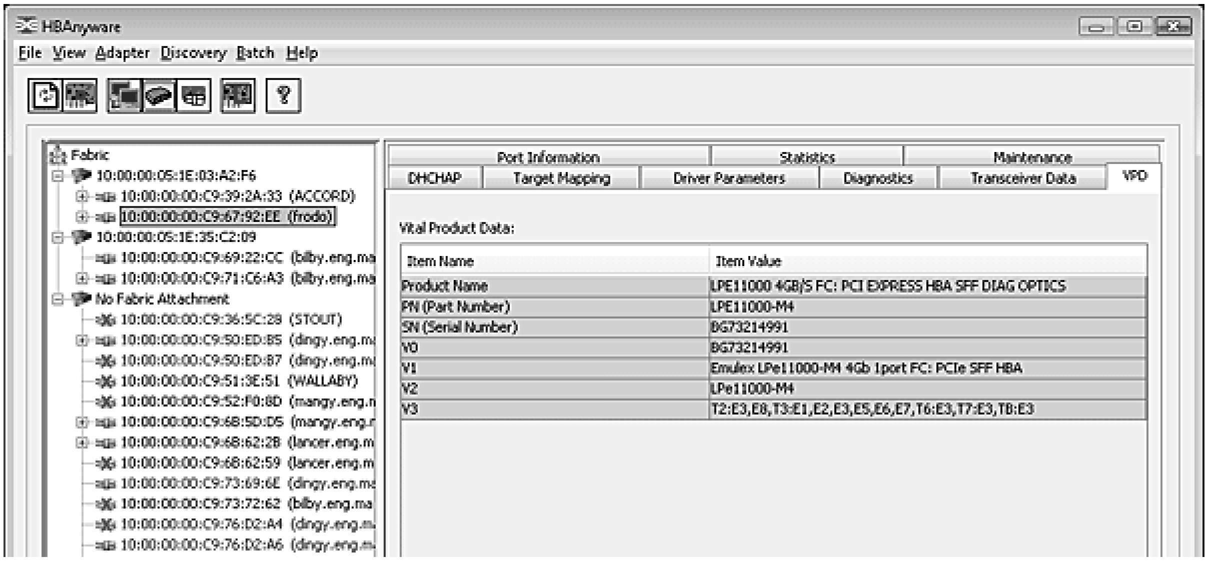
Viewing Vital Product Data (VPD)

The VPD tab displays vital product data (if available) for the selected adapter port such as the product name, part number, serial number and so on.

Note: Not supported on systems using CIM provider v1.2.1 on ESX 3i.

To view VPD information:

1. Select **Host View** or **Fabric View**.
2. In the discovery tree, select the port whose VPD information you want to view.
3. Select the **VPD** tab.


HBAnyware
File View Adapter Discovery Batch Help
Fabric
10:00:00:05:1E:03:A2:F6
10:00:00:00:C9:39:2A:33 (ACCORD)
10:00:00:00:C9:67:92:EE (frodo)
10:00:00:05:1E:35:C2:09
10:00:00:00:C9:69:22:CC (bilby.eng.ma
10:00:00:00:C9:71:C6:A3 (bilby.eng.ma
No Fabric Attachment
10:00:00:00:C9:36:5C:28 (STOUT)
10:00:00:00:C9:50:ED:85 (dingy.eng.m
10:00:00:00:C9:50:ED:87 (dingy.eng.m
10:00:00:00:C9:51:3E:51 (WALLABY)
10:00:00:00:C9:52:F0:8D (mangy.eng.n
10:00:00:00:C9:68:5D:D5 (mangy.eng.r
10:00:00:00:C9:68:62:28 (lancer.eng.m
10:00:00:00:C9:68:62:59 (lancer.eng.m
10:00:00:00:C9:73:69:6E (dingy.eng.m
10:00:00:00:C9:73:72:62 (bilby.eng.ma
10:00:00:00:C9:76:D2:A4 (dingy.eng.m
10:00:00:00:C9:76:D2:A6 (dingy.eng.m
Port Information
Statistics
Maintenance
DHCHAP
Target Mapping
Driver Parameters
Diagnostics
Transceiver Data
VPD

Vital Product Data:

Item Name	Item Value
Product Name	LPE11000 4GB/S FC: PCI EXPRESS HBA SFF DIAG OPTICS
PN (Part Number)	LPE11000-M4
SN (Serial Number)	BG73214991
V0	BG73214991
V1	Emulex LPe11000-M4 4Gb 1port FC: PCIe SFF HBA
V2	LPe11000-M4
V3	T2:E3,E8,T3:E1,E2,E3,E5,E6,E7,T6:E3,T7:E3,T8:E3

Figure 20: VPD tab

VPD Table Definitions

- Product Name - Displays product information about the selected adapter port.
- Part Number - Displays the adapter's part number.
- Serial Number - Displays the adapter's serial number.

- V*O* - Vendor unique data. “V” indicates a vendor-specific field. An adapter may have none, one or more of these fields defined. Valid values for this field are “VO” (the letter “O”, not the number zero) and “Vx” (where “x” is a number).

Note: Some adapters may show additional VPD information such as EC (EC level) and MN (manufacturer ID)

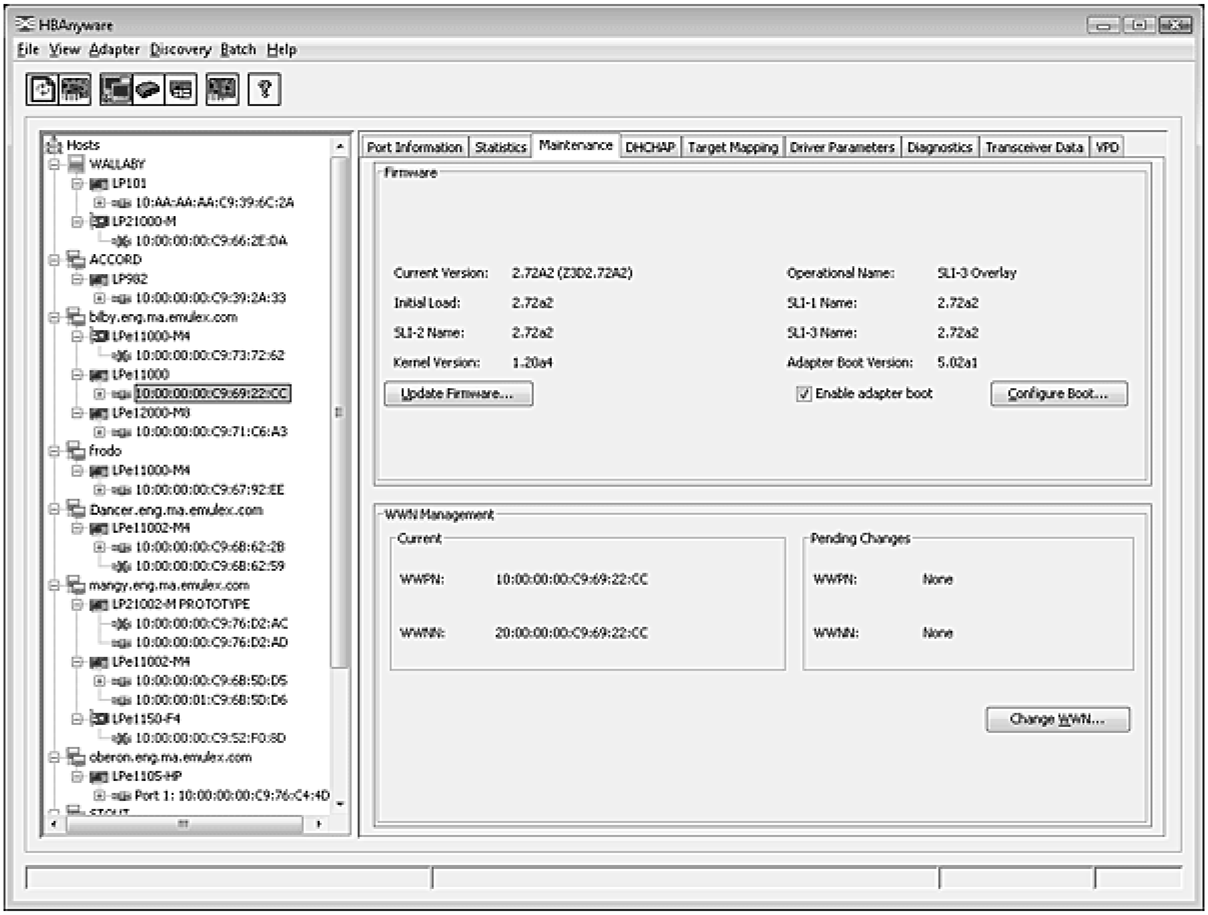
Viewing Maintenance Information

Use the Maintenance tab to view and change current firmware and boot code information. Use this tab to also view and change WWPN and WWNN information for the selected adapter port. (Not available in read-only mode.)

Note: Not all information is displayed on systems using CIM provider v1.2.1 on ESX 3i. and CIM provider v2.0 on ESX 4i.

To view the firmware information:

1. Select **Host View** or **Fabric View**.
2. Select an adapter port in the discovery-tree.
3. Select the **Maintenance** tab.



```
Hosts
  WALLABY
    LP101
      10:AA:AA:AA:C9:39:6C:2A
    LP21000-M
      10:00:00:00:C9:66:2E:DA
  ACCORD
    LP982
      10:00:00:00:C9:39:2A:33
  bilby.eng.ma.emulex.com
    LPe11000-M4
      10:00:00:00:C9:73:72:62
    LPe11000
      10:00:00:00:C9:69:22:CC
    LPe12000-M8
      10:00:00:00:C9:71:C6:A3
  frodo
    LPe11000-M4
      10:00:00:00:C9:67:92:EE
  Dancer.eng.ma.emulex.com
    LPe11002-M4
      10:00:00:00:C9:68:62:28
      10:00:00:00:C9:68:62:59
  mangy.eng.ma.emulex.com
    LP21002-M PROTOTYPE
      10:00:00:00:C9:76:D2:AC
      10:00:00:00:C9:76:D2:AD
    LPe11002-M4
      10:00:00:00:C9:68:5D:D5
      10:00:00:01:C9:68:5D:D6
    LPe1150-F4
      10:00:00:00:C9:52:F0:8D
  oberon.eng.ma.emulex.com
    LPe1105-HP
      Port 1: 10:00:00:00:C9:76:C4:4D
  STOUT
```

Firmware

Current Version: 2.72A2 (Z3D2.72A2)
Initial Load: 2.72a2
SLI-2 Name: 2.72a2
Kernel Version: 1.20a4
Operational Name: SLI-3 Overlay
SLI-1 Name: 2.72a2
SLI-3 Name: 2.72a2
Adapter Boot Version: 5.02a1
☑ Enable adapter boot

WWN Management

Current
WWPN: 10:00:00:00:C9:69:22:CC
WWNN: 20:00:00:00:C9:69:22:CC

Pending Changes
WWPN: None
WWNN: None

Figure 21: Maintenance Tab

Firmware Field Definitions

Firmware Area

- Current Version - The Emulex firmware version number for this model of adapter.
- Initial Load - The firmware version stub responsible for installing SLI code into its proper slot. (Not available on VMware ESX servers being managed through the CIM interface.)
- SLI-2 Name - The name of the SLI-2 firmware overlay. (Not available on VMware ESX servers being managed through the CIM interface.)
- Kernel Version - The version of the firmware responsible for starting the driver. (Not available on VMware ESX servers being managed through the CIM interface.)
- Operational Name -The name of the operational firmware for the selected adapter. (Not available on VMware ESX servers being managed through the CIM interface.)
- SLI-1 Name - The name of the SLI-1 firmware overlay. (Not available on VMware ESX servers being managed through the CIM interface.)
- SLI-3 Name - The name of the SLI-3 firmware overlay. (Not available on VMware ESX servers being managed through the CIM interface.)
- Adapter Boot Version - Displays one of the following:
  - The selected adapter port's boot code version if boot code is present.
  - “Disabled” if the boot code is disabled.
  - “Not Present” if boot code is not loaded. If boot code is not loaded, the Enable Adapter boot checkbox is not visible and you cannot configure the selected port to boot from SAN.
- Enable adapter boot checkbox - Check this box if you want the adapter to load and execute boot code during system startup. Click **Configure Boot** to configure boot from SAN. (Not available in read-only mode.) See “Configuring Boot from SAN” on page 89 for more information.

Note: Enabling adapter boot only causes the adapter to load the boot code and execute it during system startup. It does not mean that the adapter will boot from SAN. To boot from SAN, the boot type must be enabled to boot from SAN. Do this in the Boot from SAN configuration window for each boot type. In addition, the BIOS must be configured to boot from SAN.

WWN Management Area

Note: Not supported on COMSTAR and VMware ESX servers being managed through the CIM interface.

Current

- WWPN - Displays the World Wide Port Name for the selected adapter port.
- WWNN - Displays the World Wide Node Name for the selected adapter port.

Pending Changes

- WWPN - Works in conjunction with the Change WWN button. Displays the World Wide Port Name you assigned for the selected adapter port, but the system must be rebooted for these changes to take effect and appear under the “Current” listing. See “Configuring Boot from SAN” on page 89 for more information.
- WWNN - Works in conjunction with the Change WWN button. Displays the World Wide Node Name you assigned for the selected adapter port, but the system must be rebooted for these changes to take effect and appear under the “Current” listing. See “Configuring Boot from SAN” on page 89 for more information.

Maintenance Tab Buttons (Not available in read-only mode.)

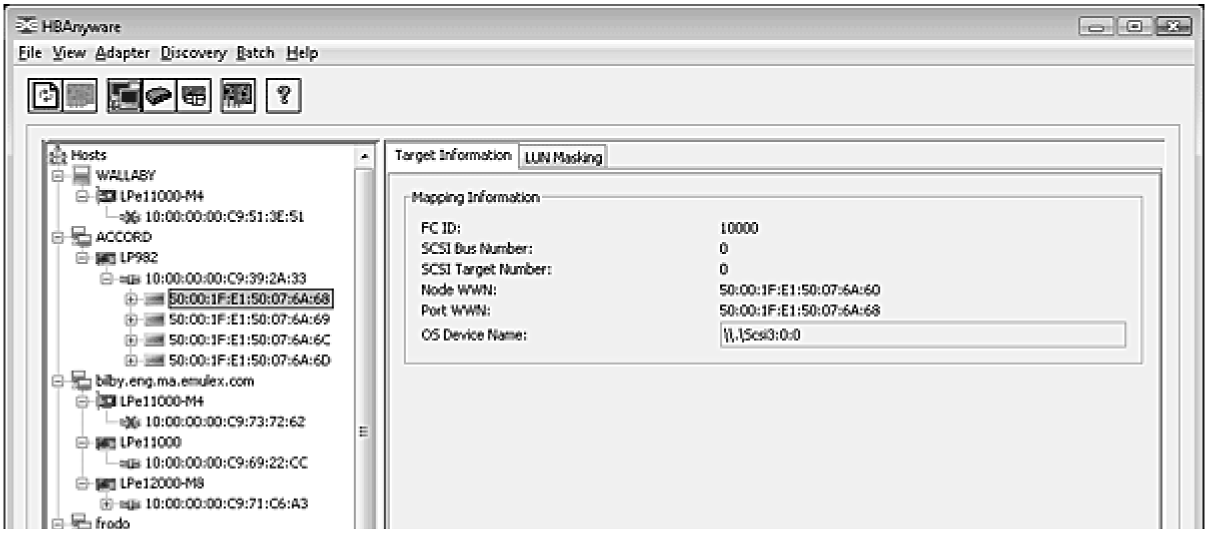
- Update Firmware - Click to update firmware on the selected adapter. See “Updating Adapter Firmware” on page 74 for more information.
- Configure Boot - Check Enable adapter boot and click Configure Boot to configure boot from SAN. See “Configuring Boot from SAN” on page 89 for more information. (Not available on VMware ESX servers being managed through the CIM interface.)
- Change WWN - Click to change the selected adapter port's World Wide Node Name or World Wide Port Name. See “Configuring Boot from SAN” on page 89 for more information. (Not available on VMware ESX servers being managed through the CIM interface.)

Viewing Target Information

Target Information contains information specific to the selected storage device.

To view target information:

1. Select **Host View, Fabric View** or **Virtual Port View**.
2. In the discovery-tree, select the target whose information you want to view. The Target Information tab appears.



FC ID: 10000
SCSI Bus Number: 0
SCSI Target Number: 0
Node WWN: 50:00:1F:E1:50:07:6A:60
Port WWN: 50:00:1F:E1:50:07:6A:68
OS Device Name: \\.\Scsi3:0:0

Figure 22: Target Information tab

Target Information Field Definitions

- Mapping Information Area
  - FC ID - The FC ID for the target; assigned automatically in the firmware.
  - SCSI Bus Number - The SCSI Bus number to which the target is mapped.
  - SCSI Target Number - The target's identifier on the SCSI Bus.
  - Node WWN - A unique 64-bit number, in hexadecimal, for the target (N_PORT or NL_PORT).
  - Port WWN - A unique 64-bit number, in hexadecimal, for the fabric (F_PORT or Switched Fabric Loop Port [FL_PORT]).
  - OS Device Name - The operating system device name.

Note: See “Masking and Unmasking LUNs (Windows)” on page 84 for more information on LUN Masking.

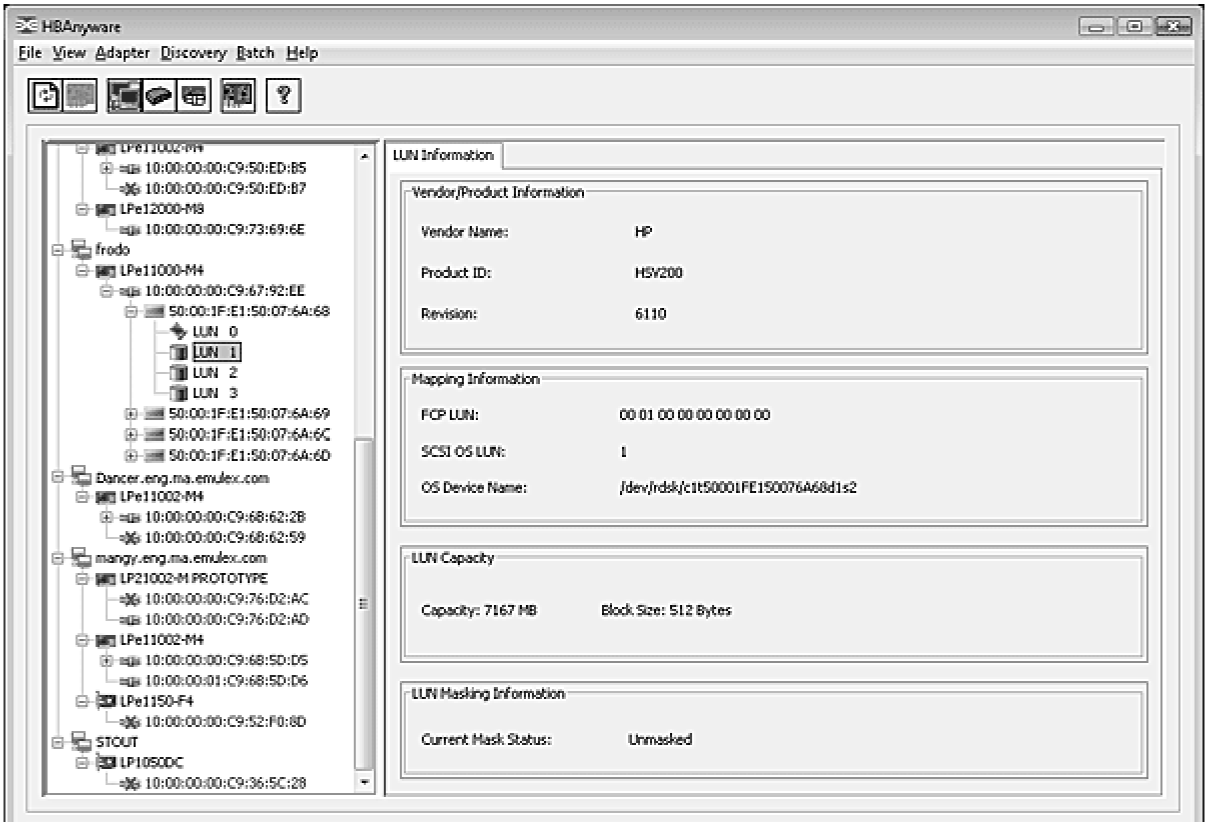
Viewing LUN Information

The LUN Information tab contains information about the selected logical unit number (LUN).

Note: LUNs that are associated with a manageable COMSTAR port will not appear in the discovery-tree and cannot be configured using the HBAnyware utility or HbaCmd. To view the LUNs using the HBAnyware utility, you must view the COMSTAR port as a target.

To view the LUN information:

1. Select **Host View, Fabric View** or **Virtual Port View**.
2. In the discovery-tree, select the LUN whose information you want to view. The LUN Information tab appears.



Vendor/Product Information

Vendor Name: HP

Product ID: HSV200

Revision: 6110

Mapping Information

FCP LUN: 00 01 00 00 00 00 00 00

SCSI OS LUN: 1

OS Device Name: /dev/rdsk/c1t50001FE150076A68d1s2

LUN Capacity

Capacity: 7167 MB Block Size: 512 Bytes

LUN Masking Information

Current Mask Status: Unmasked

Figure 23: LUN Information

LUN Information Field Definitions

Vendor Product Information Area

- Vendor Name - The name of the vendor of the LUN.
- Product ID - The vendor-specific ID for the LUN.
- Revision - The vendor-specific revision number for the LUN.

Mapping Information Area

- FCP LUN - The FC identifier used by the adapter to map to the SCSI OS LUN.
- SCSI OS LUN - The SCSI identifier used by the OS to map to the specific LUN.
- OS Device Name - The name assigned by the OS to the LUN.

LUN Capacity Area

Note: LUN capacity information is only provided when the LUN is a mass-storage (disk) device. Other devices like tapes and scanners, etc. do not display capacity.

- Capacity - The capacity of the LUN, in megabytes.
- Block Size - The length of a logical unit block in bytes.

LUN Masking Area

- Current Mask Status - Possible states are masked or unmasked.

Viewing Target Mapping (Windows and Solaris SFS)

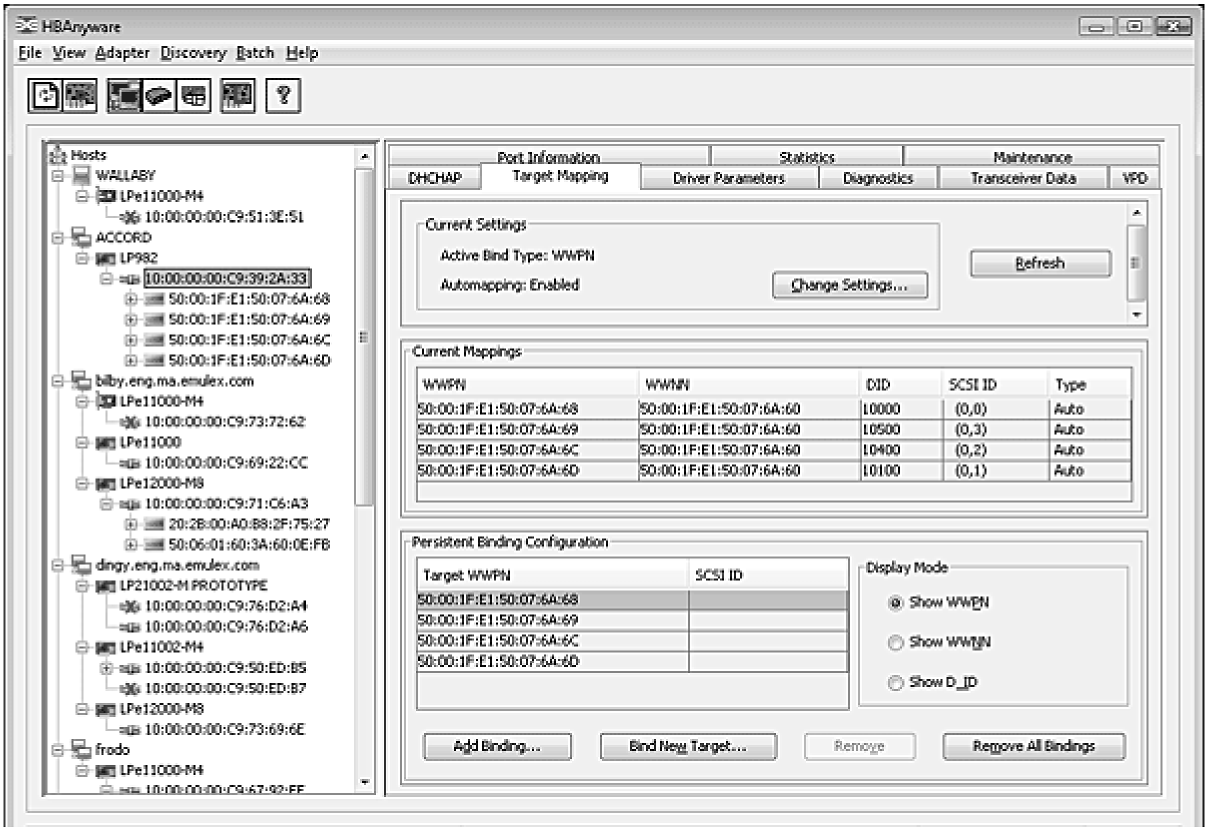
The Target Mapping tab enables you to view current target mapping and to set up persistent binding.

Note: On Solaris SFS systems persistent binding is not supported.

Note: Target Mapping tab is not available on COMSTAR ports.

To view target mapping:

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, select the adapter port whose target mapping information you want to view.
3. Select the **Target Mapping** tab.



```
Hosts
  WALLABY
    LPe11000-M4
      10:00:00:00:C9:51:3E:51
  ACCORD
    LP982
      10:00:00:00:C9:39:2A:33
        50:00:1F:E1:50:07:6A:68
        50:00:1F:E1:50:07:6A:69
        50:00:1F:E1:50:07:6A:6C
        50:00:1F:E1:50:07:6A:6D
  bilby.eng.ma.emulex.com
    LPe11000-M4
      10:00:00:00:C9:73:72:62
    LPe11000
      10:00:00:00:C9:69:22:CC
    LPe12000-M8
      10:00:00:00:C9:71:C6:A3
        20:28:00:A0:B8:2F:75:27
        50:06:01:60:3A:60:0E:FB
  dingy.eng.ma.emulex.com
    LP21002-M PROTOTYPE
      10:00:00:00:C9:76:D2:A4
      10:00:00:00:C9:76:D2:A6
    LPe11002-M4
      10:00:00:00:C9:50:ED:B5
      10:00:00:00:C9:50:ED:B7
    LPe12000-M8
      10:00:00:00:C9:73:69:6E
  frodo
    LPe11000-M4
      10:00:00:00:C9:67:92:FF
```

Current Settings

Active Bind Type: WWPN

Automapping: Enabled

Current Mappings

WWPN	WWNN	DID	SCSI ID	Type
50:00:1F:E1:50:07:6A:68	50:00:1F:E1:50:07:6A:60	10000	(0,0)	Auto
50:00:1F:E1:50:07:6A:69	50:00:1F:E1:50:07:6A:60	10500	(0,3)	Auto
50:00:1F:E1:50:07:6A:6C	50:00:1F:E1:50:07:6A:60	10400	(0,2)	Auto
50:00:1F:E1:50:07:6A:6D	50:00:1F:E1:50:07:6A:60	10100	(0,1)	Auto

Persistent Binding Configuration

Target WWPN	SCSI ID
50:00:1F:E1:50:07:6A:68	
50:00:1F:E1:50:07:6A:69	
50:00:1F:E1:50:07:6A:6C	
50:00:1F:E1:50:07:6A:6D	

Display Mode

● Show WWPN

○ Show WWNN

○ Show D_ID

Figure 24: Target Mapping tab

Target Mapping Field Definitions

Current Settings Area

- Active Bind Type - WWPN, WWNN, or a destination identifier (D_ID).
- Automapping - The current state of SCSI device automapping: enabled (default) or disabled.
- Auto-Persistent Binding - The current state of the Auto-Persistent binding service. (Not available on VMware ESX servers being managed through the CIM interface.)

Current Mappings Area

- This table lists current mapping information for the selected adapter port.

Persistent Binding Configuration Area

- This table lists persistent binding information for the selected adapter port. (Not available on VMware ESX servers being managed through the CIM interface.)

Display Mode Radio Buttons

- Show WWPN, Show WWNN or Show D_ID options enable you to choose how to display information in the Persistent Binding Configuration table.

Target Mapping Buttons

- Refresh - Click to refresh the Target Mapping tab.
- Change Settings - Click to enable or disable automapping, choose a bind type and enable or disable LUN mapping and unmasking. (Not available on VMware ESX servers being managed through the CIM interface.)
- Add Binding - Click to add a persistent binding.
- Bind New Target - Click to add a target that does not appear in the Persistent Binding table.
- Remove - Click to remove the selected binding.
- Remove All Bindings - Click to remove all persistent bindings that are displayed.

Viewing Target Mapping (Linux and VMware ESX)

Use this tab to view target mapping. The Target Mapping tab is read-only.

Note: Persistent binding is not supported by the Linux 2.6 kernel, the Emulex 8.2 version of the driver for Linux or by VMware ESX Server.

Note: On VMware ESX systems persistent binding is not supported.

Note: Not all information is displayed on systems using CIM provider v1.2.1 on ESX 3i and CIM provider v2.0 on ESX 4i.

To view target mapping:

1. Select **Host View** or **Fabric View**.
2. Select the adapter port in the discovery-tree whose target mapping information you want to view.
3. Select the **Target Mapping** tab.

Target Mapping Field Definitions

Current Settings Area

- Active Bind Type - N/A
- Automapping - N/A

Current Mappings Area

- This table lists current mapping information for the selected adapter.

Persistent Binding Configuration Area

- N/A

Display Mode Radio Buttons

- N/A

Target Mapping Buttons

- N/A

Managing Adapters

This section describes the various adapter management functions you can perform using HBAnyware.

Configuring the Adapter Driver

The HBAnyware utility displays available driver parameters along with their defaults and maximum and minimum settings. A description of the selected parameter is also provided. This section contains information you should be aware of when working with driver parameters. For a more detailed description of specific driver parameters, refer to the appropriate Emulex driver User Manual. (Not available in read-only mode.)

Note: In Solaris SFS and Linux, you can also specify parameters when loading the driver manually. (Not available in read-only mode.) Refer to the appropriate driver manual for instructions.

Activation Requirements

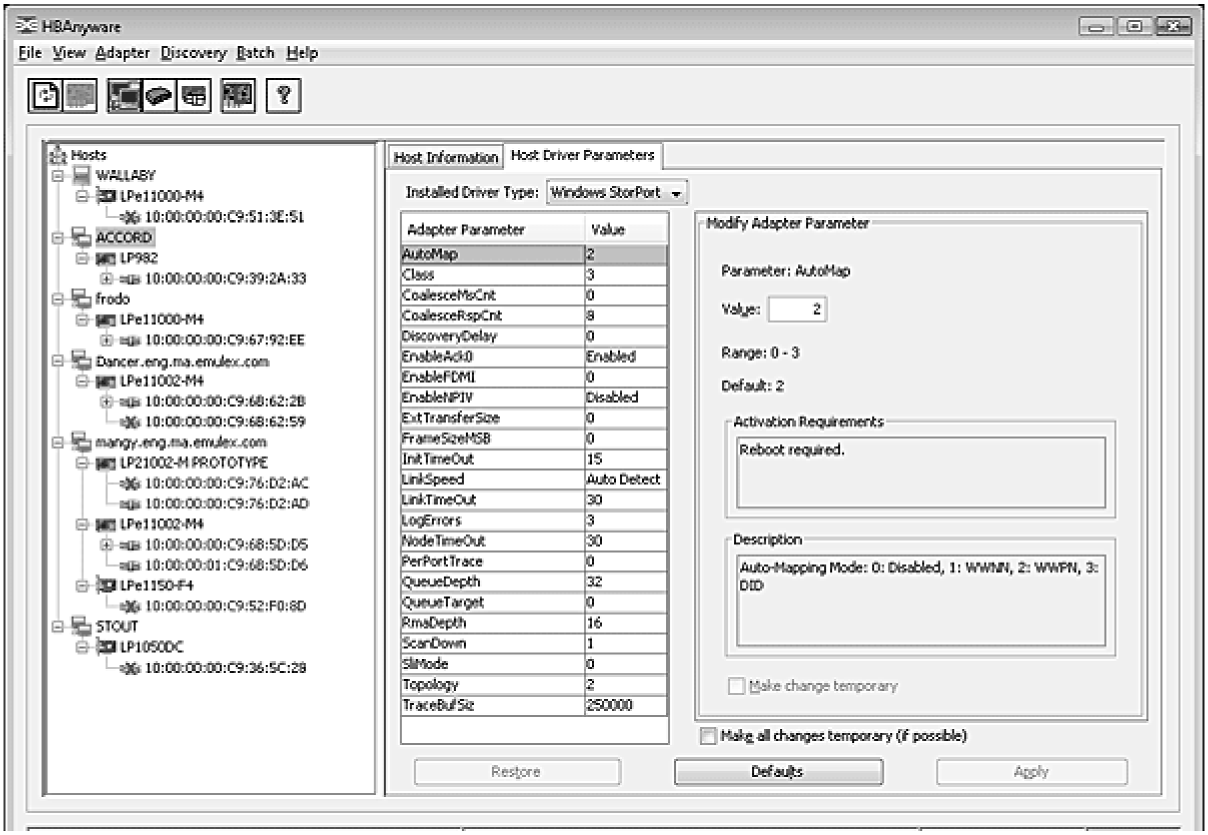
A parameter has one of the following activation requirements:

- Dynamic - The change takes effect while the system is running.
- Reset - Requires an adapter reset from the utility before the change takes effect.
- Reboot - Requires reboot of the entire machine before the change takes effect. In this case, you are prompted to perform a reboot when you exit the utility.

The Host Driver Parameters Tab

The Host Driver Parameters tab enables you to view and edit the adapter driver parameter settings contained in a specific host. The host driver parameters are global values and apply to all adapters in that host unless they are overridden by parameters assigned to a specific adapter using the adapter Driver Parameters tab. For each parameter, the tab shows the current value, the range of acceptable values, the default value, and whether the parameter is dynamic. A dynamic parameter allows the change to take effect without resetting the adapter or rebooting the system.

For information on changing parameters for a single adapter, see “Setting Driver Parameters” on page 51. For information on changing parameters for the host, see “Setting Driver Parameters for All Adapters in a Host” on page 54.



Installed Driver Type: Windows StorPort

Adapter Parameter	Value
AutoMap	2
Class	3
CoalesceMsCnt	0
CoalesceRspCnt	8
DiscoveryDelay	0
EnableAck0	Enabled
EnableFDMI	0
EnableNPIV	Disabled
ExtTransferSize	0
FrameSizeMSB	0
InitTimeOut	15
LinkSpeed	Auto Detect
LinkTimeOut	30
LogErrors	3
NodeTimeOut	30
PerPortTrace	0
QueueDepth	32
QueueTarget	0
RmaDepth	16
ScanDown	1
SliMode	0
Topology	2
TraceBufSiz	250000

Modify Adapter Parameter

Parameter: AutoMap

Value: 2

Range: 0 - 3

Default: 2

Activation Requirements

Reboot required.

Description

Auto-Mapping Mode: 0: Disabled, 1: WWNN, 2: WWPN, 3: DID

☐ Make change temporary

☐ Make all changes temporary (if possible)

Figure 25: Host Driver Parameters tab

Host Driver Parameters Tab Field Definitions

- Installed Driver Type - The current driver installed on this host. If there is more than one driver type installed, the Installed Driver Types menu shows a list of all driver types and driver versions that are installed on the HBAs in the host.
- Adapter Parameter table - A list of adapter driver parameters and their current values.

Modify Adapter Parameter Area

- Adapter-specific information is displayed in this area. This can include value, range, default, activation requirements and description.

Driver Parameters Tab Buttons (Not available in read-only mode.)

- Restore - If you changed driver parameters, but did not click **Apply** and you want to restore the parameters to their last saved values, click **Restore**.
- Defaults - Click to reset all driver parameter values to their default (out-of-box) values.

  Note: Driver parameter values are not supported on hosts being managed through the CIM interface.

- Apply - Click to apply any driver parameter changes. If you changed a driver parameter that is not dynamic, you may need to reset the adapter port or reboot the system.

Setting Driver Parameters

The Driver Parameters tab for adapters and hosts enable you to modify driver parameters for a specific adapter or all adapters in a host.

For example, if you select a host in the discovery-tree, you can globally change the parameters for all HBAs in that host. If you select an adapter port in the discovery-tree, you can change the lpfc_use_adisc, lpfc_log_verbose and the lpfc_nodev_tmo parameters for only that adapter.

For each parameter, the Driver Parameters tabs show the current value, the range of acceptable values, the default value, and the activation requirement. You can also restore parameters to their default settings.

You can apply driver parameters for one adapter to other adapters in the system using the Driver Parameters tab, thereby simplifying multiple adapter configuration. See “Creating a Batch Mode Driver Parameters File” on page 59 for more information.

Note: The Linux 2.6 kernel only supports setting the log_verbose, nodev_tmo and use_adisc driver parameters for individual HBAs. You must apply other driver parameters to all HBAs contained in the host.

Note: For all compatible Linux versions: If you change driver parameters using the HBAnyware or hbacmd utilities and you want these changes to be permanent and persist across system reboots, you must create a new ramdisk image. The ramdisk image is used when the kernel is initialized during system startup, and loads the LPFC driver with the updated driver parameters.

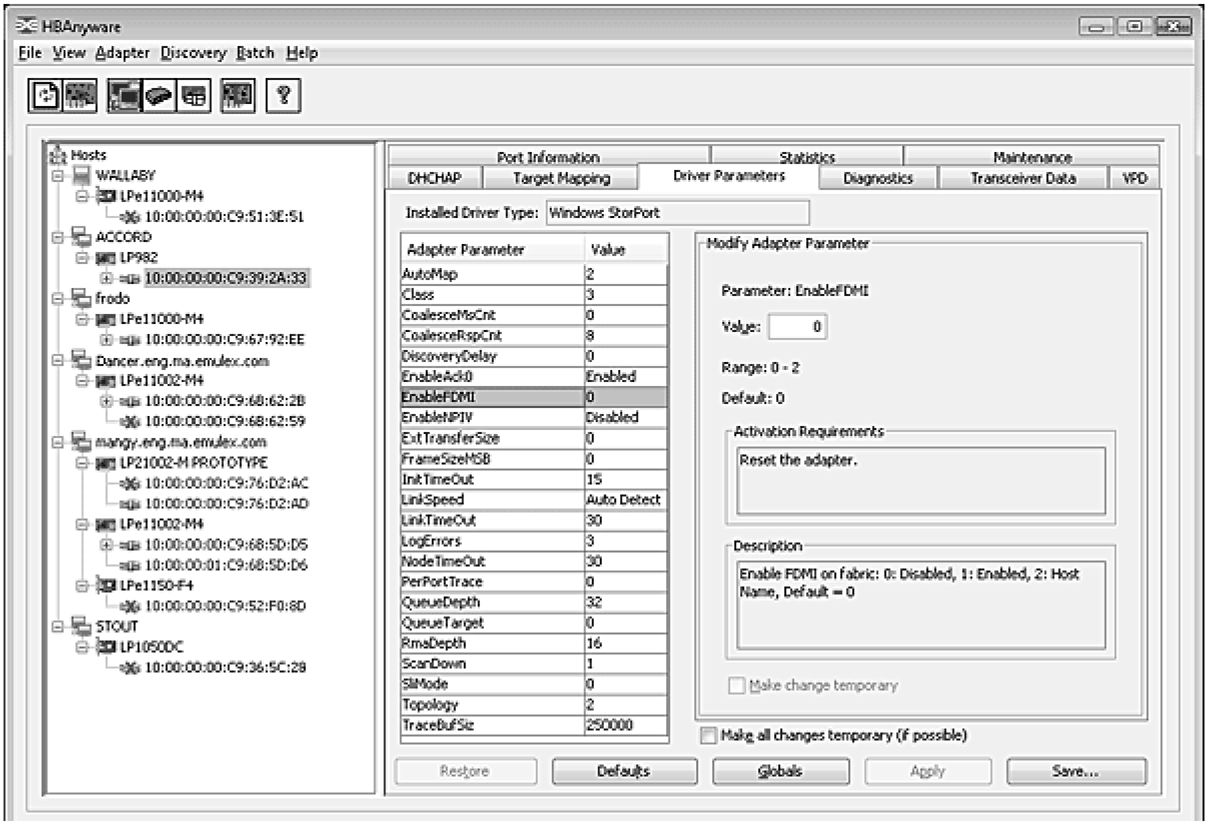
To create a new ramdisk you can use the LPFC driver's lpfc-install script. Refer to the “Creating a New Ramdisk” section of the Emulex Driver for Linux User Manual for instructions.

Note: For VMware ESX 3.5 and VMware ESX 4.0: If you change driver parameters using the HBAnyware or hbacmd utilities and you want these changes to be permanent and persist across system reboots, you must create a new ram disk image. The ram disk image is used when the kernel is initialized during system startup and loads the LPFC driver with the updated driver parameters.

Setting Driver Parameters for a Single Adapter

To change the driver parameters for a single adapter:

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, select the adapter port whose parameters you wish to change.
3. Select the **Driver Parameters** tab. The parameter values for the selected adapter are displayed.



Hosts
- WALLABY
  - LPe11000-M4
    - 10:00:00:00:C9:51:3E:51
- ACCORD
  - LP982
    - 10:00:00:00:C9:39:2A:33
- frodo
  - LPe11000-M4
    - 10:00:00:00:C9:67:92:EE
- Dancer.eng.ma.emulex.com
  - LPe11002-M4
    - 10:00:00:00:C9:68:62:2B
    - 10:00:00:00:C9:68:62:59
- mangy.eng.ma.emulex.com
  - LP21002-M PROTOTYPE
    - 10:00:00:00:C9:76:D2:AC
    - 10:00:00:00:C9:76:D2:AD
  - LPe11002-M4
    - 10:00:00:00:C9:68:5D:D5
    - 10:00:00:01:C9:68:5D:D6
  - LPe1150-F4
    - 10:00:00:00:C9:52:F0:8D
- STOUT
  - LP1050DC
    - 10:00:00:00:C9:36:5C:28

Installed Driver Type: Windows StorPort

Adapter Parameter	Value
AutoMap	2
Class	3
CoalesceMsCnt	0
CoalesceRspCnt	8
DiscoveryDelay	0
EnableAck0	Enabled
EnableFDMI	0
EnableNPIV	Disabled
ExtTransferSize	0
FrameSizeMSB	0
InitTimeOut	15
LinkSpeed	Auto Detect
LinkTimeOut	30
LogErrors	3
NodeTimeOut	30
PerPortTrace	0
QueueDepth	32
QueueTarget	0
RmaDepth	16
ScanDown	1
SliMode	0
Topology	2
TraceBufSiz	250000

Modify Adapter Parameter

Parameter: EnableFDMI

Value: 0

Range: 0 - 2

Default: 0

Activation Requirements

Reset the adapter.

Description

Enable FDMI on fabric: 0: Disabled, 1: Enabled, 2: Host Name, Default = 0

□ Make change temporary

□ Make all changes temporary (if possible)

Figure 26: Driver Parameters tab - Adapter Selected

4. In the Driver Parameters tab, click the parameter that you want to change. A description of the parameter appears on the right side of the tab.
5. Enter a new value in the Value field in the same hexadecimal or decimal format as the current value or select a value from the drop-down menu. If you enter a value and the current value is in hexadecimal format, it is prefaced by “0x” (for example, 0x2d). You can enter a new hexadecimal value without the “0x”. For example, if you enter ff10, this value is interpreted and displayed as “0xff10”.
6. If you want the change to be temporary (causing the parameter to revert to its last permanent setting when the system is rebooted), check the **Make change temporary** box. This option is available only for dynamic parameters.
7. If you are making changes to multiple parameters, and you want all the changes to be temporary, check the **Make all changes temporary** box. This setting overrides the setting of the **Make change temporary** box. Only dynamic parameters can be made temporary.
8. Click **Apply**.

Restoring All Parameters to Their Earlier Values

If you changed parameters, but did not click **Apply** and you want to restore the parameters to their last saved values, click **Restore**.

Resetting All Default Values

To reset all parameter values to their default (factory) values, click **Defaults**.

Setting an Adapter Parameter Value to the Host Adapter Parameter Value

To set an adapter parameter value to the corresponding host parameter value:

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, select the adapter port.
3. Select the **Driver Parameters** tab.
4. Click **Globals**. All parameter values are now the same as the global, or host, values.
5. To apply the global values, click **Apply**.

Saving Adapter Driver Parameters to a File

To save a desired adapter parameter configuration click **Save**. To apply your configuration changes, click **Apply**.

Each definition is saved in a comma-delimited file with the following format:

```
<parameter-name>=<parameter-value>
```

The file is saved in the Emulex Repository directory.

In Windows: \Program Files\Emulex\Util\Emulex Repository or
\Program Files (x64)\Emulex\Util\Emulex Repository for any IA64/x64 systems.

In Linux: /usr/sbin/hbanyware/RMRepository

In VMware ESX: /etc/cim/emulex/RMRepository

In Solaris SFS: /opt/hbanyware/RMRepository

Note: HBAnyware with Web Launch driver parameters files are saved on the host that the browser was launched from not the host IP specified in browser.

The HBAnyware utility can then use the Batch Driver Parameter Update function to apply these saved settings to any or all compatible adapters on the SAN.

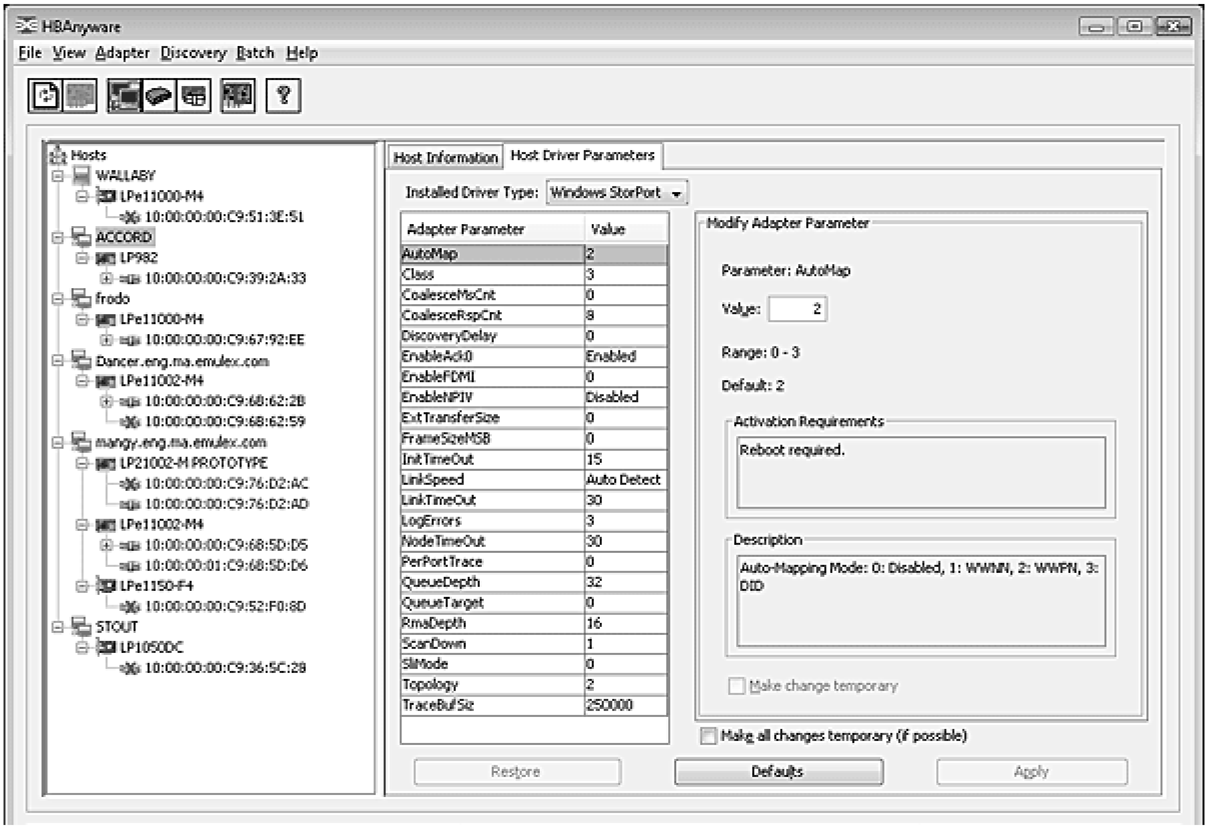
Note: Persistent binding settings cannot be saved with the Save feature.

Note: Host driver parameters cannot be saved.

Setting Driver Parameters for All Adapters in a Host

To change the driver parameters for all adapters installed in a host:

1. Do one of the following:
   - From the **View** menu, click **Hosts**.
   - From the toolbar, click **Host View**.
2. In the discovery-tree, click the host whose adapter driver parameters you want to change.
3. Select the **Host Driver Parameters** tab. If there are adapters with different driver types installed, the **Installed Driver Types** menu shows a list of all driver types and driver versions that are installed. Select the driver whose parameters you want to change. This menu does not appear if all the adapters are using the same driver.
4. In the Host Driver Parameters tab, click the parameter that you want to change. A description of the parameter appears on the right side of the tab.



```
Hosts
  WALLABY
    LPe11000-M4
      10:00:00:00:C9:51:3E:51
  ACCORD
    LP982
      10:00:00:00:C9:39:2A:33
  frodo
    LPe11000-M4
      10:00:00:00:C9:67:92:EE
  Dancer.eng.ma.emulex.com
    LPe11002-M4
      10:00:00:00:C9:68:62:2B
      10:00:00:00:C9:68:62:59
  mangy.eng.ma.emulex.com
    LP21002-M PROTOTYPE
      10:00:00:00:C9:76:D2:AC
      10:00:00:00:C9:76:D2:AD
    LPe11002-M4
      10:00:00:00:C9:68:5D:D5
      10:00:00:01:C9:68:5D:D6
    LPe1150-F4
      10:00:00:00:C9:52:F0:8D
  STOUT
    LP1050DC
      10:00:00:00:C9:36:5C:28
```

Installed Driver Type: Windows StorPort

Adapter Parameter	Value
AutoMap	2
Class	3
CoalesceMsCnt	0
CoalesceRspCnt	8
DiscoveryDelay	0
EnableAck0	Enabled
EnableFDMI	0
EnableNPIV	Disabled
ExtTransferSize	0
FrameSizeMSB	0
InitTimeOut	15
LinkSpeed	Auto Detect
LinkTimeOut	30
LogErrors	3
NodeTimeOut	30
PerPortTrace	0
QueueDepth	32
QueueTarget	0
RmaDepth	16
ScanDown	1
SliMode	0
Topology	2
TraceBufSiz	250000

Modify Adapter Parameter

Parameter: AutoMap

Value: 2

Range: 0 - 3

Default: 2

Activation Requirements

Reboot required.

Description

Auto-Mapping Mode: 0: Disabled, 1: WWNN, 2: WWPN, 3: DID

☐ Make change temporary

☐ Make all changes temporary (if possible)

Figure 27: Host Driver Parameters tab - Host Selected

5. Enter a new value in the Value field in decimal or hexadecimal format, depending on how the current value is presented. If the value is in hexadecimal format, it is prefaced by “0x” (for example -”0x2d”).
6. To make a change temporary (the parameter to revert to its last permanent setting when the system is rebooted), check **Make changes temporary**. This option is available only for dynamic parameters.
7. To make changes to multiple parameters, check **Make all changes temporary.** Only dynamic parameters can be made temporary.
8. Click **Apply**.

Changing Non-dynamic Parameter Values (Linux 8.2)

To change non-dynamic parameter values for Linux version 8.2:

1. Navigate to the /usr/sbin/hbanyware directory and run the scripts to stop the HBAnyware utility processes. Type:

   ```
   ./stop_hbanyware
   ```
2. Stop all I/O to LPFC attached devices.
3. Unload the LPFC driver. Type:

   ```
   modprobe -r lpfc
   ```
4. If DHCHAP authentication is currently employed on this machine, start up the Emulex Fibre Channel authentication service. Type:

   ```
   /etc/init.d/fcauthd start
   ```

5. Reload the driver. Type:

   ```
   modprobe lpfc
   ```

6. Start the elxhbamgr service (remote service). Type:

   ```
   ./start_elxhbamgr
   ```

   The HBAnyware discovery service starts automatically when you launch the application.

   Note: If DHCHAP authentication is currently employed on Emulex adapters on this machine, you must type `"/etc/init.d/fcauthd start"` to restart the authentication daemon.

   If the machine has HBAnyware with Web Launch installed, the RMI services must be restarted. Type:

   ```
   ./start_weblaunch
   ```

   Note: For changes to persist after a reboot, you must create a new ramdisk image. Refer to the Emulex Driver for Linux User Manual for more information.

Changing Non-dynamic Parameter Values (VMware ESX)

To change non-dynamic parameter values:

1. Navigate to the /usr/sbin/hbanyware directory and run the scripts to stop the HBAnyware utility processes. Type:

   ```
   ./stop_hbanyware
   ```

2. Stop all I/O to LPFC attached devices.
3. For VMware ESX 3.5 run the following command:

   ```
   esxcfg-boot -b
   ```

   For VMware ESX 4.0 run the following command:

   ```
   esxcfg-boot --sched-rdbuild
   ```

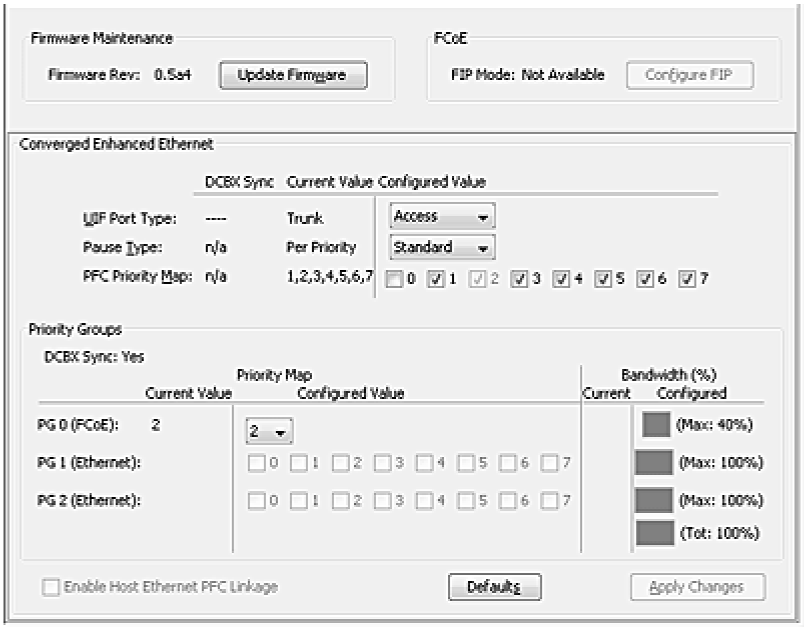
4. Reboot the system.

Configuring CEE/FCoE-Specific Parameters

The CEE (Converged Enhanced Ethernet) tab allows you to view and configure the CEE-specific parameters for the selected port. The CEE tab will only appear if you select a CEE adapter (such as an LP21000) from the discovery-tree and if the CEE tab is enabled. See “Customizing Tab Views” on page 20 for more information.

Note: If you are running HBAnyware 4.1 and you are attempting to manage CNAs running HBAnyware 4.0 or VMware ESX 3i, VMware ESX 4i or a VMware ESX 4.0 using the CIM client interface, a message will be displayed indicating that certain features may not be available for the CNA. If the server is running HBAnyware 4.0, these features may be enabled by installing HBAnyware 4.1 on the server. These features are not available at this time in VMware ESX environments.

- When DCBX is present, the Current Values are received from the switch and can only be changed by configuring the switch. Changing the Configured Values save the values to the adapter, but they will not be used.
- When DCBX is NOT present, the Current Values reflect the values being used by the adapter. Changes to Configured Values take effect immediately and are copied to the Current Values column.



Firmware Maintenance

Firmware Rev: 0.5a4

FCoE

FIP Mode: Not Available

Converged Enhanced Ethernet

	DCBX Sync	Current Value	Configured Value
UIF Port Type:	----	Trunk	Access ▾
Pause Type:	n/a	Per Priority	Standard ▾
PFC Priority Map:	n/a	1,2,3,4,5,6,7	□ 0 ☑ 1 ☑ 2 ☑ 3 ☑ 4 ☑ 5 ☑ 6 ☑ 7

Priority Groups

DCBX Sync: Yes

	Priority Map		Bandwidth (%)	
	Current Value	Configured Value	Current	Configured
PG 0 (FCoE):	2	2 ▾		▨ (Max: 40%)
PG 1 (Ethernet):		□ 0 □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7		▨ (Max: 100%)
PG 2 (Ethernet):		□ 0 □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7		▨ (Max: 100%)
				▨ (Tot: 100%)

□ Enable Host Ethernet PFC Linkage

Figure 28: CEE/FCoE tab, Configuration area

Converged Enhanced Ethernet Area Field Definitions

- UIF Port Type - Select between Access and Trunk port types using the menu. The DCBX Sync column indicates if the feature parameter exchange with the switch was successful. “Yes” means it was successful. “No” means it was not successful. The Current Value column indicates the current setting for the value.
- Pause Type - Select the Ethernet flow control type. Select between standard PAUSE flow control and Per Priority based PAUSE flow control. Per Priority based flow control means the Ethernet network is seen as 8 virtual lanes (a.k.a. “Priorities”) of traffic rather than one. Possible drop down values are Standard and Per Priority. The DCBX Sync column indicates if the feature parameter exchange with the switch was successful. “Yes” means it was successful. “No” means it was not successful. The Current Value column indicates the current setting for the value.

Priority Groups Area Field Definitions

- DCBX Sync - The Priority Group settings are exchanged with the switch as an entire set. “Yes” means it was successful. “No” means it was not successful.
- Priority Map - A series of eight checkboxes that can only be selected if the Pause Type is set to “Per Priority”. Selected values correspond to the flow control priorities being used by the board. The value of the FCoE Priority must always be included among the PFC Priority Map values. Select a number of values from 1 to 8. Possible values are 0 to 7. The DCBX Sync column indicates if the feature parameter exchange with the switch was successful. “Yes” means it was successful. “No” means it was not successful. The Current Value column indicates the current setting for the value. The priority groups are updated under the following rules:
    - The priorities set for the PFC Priority Map can only be set in either the PG 1 or PG 2 group exclusively. They cannot cross priority groups. Possible values are 0 to 7.
    - Bandwidths cannot exceed their maximum values.

- Bandwidth percentages must add up to 100%.

Note: If you are running older adapter firmware or managing a remote host running HBAnyware version 4.0, the PG 1 and PG 2 settings and all bandwidth settings are disabled.

- Enable Host Ethernet PFC Linkage checkbox - Enables the internal PFC flag. The internal PFC flag indicates whether or not the host Ethernet PFC setting is changed in tandem with the external interface setting. The change does not take effect until the Apply button is clicked.

Note: If you are running older adapter firmware or managing a remote host running HBAnyware version 4.0, the Enable Host Ethernet PFC Linkage checkbox is disabled.

FCoE Area Definitions

- FIP Mode - Indicates whether or not FIP (FCoE Initialization Protocol) is enabled.

CEE/FCoE Tab Buttons

- Apply Changes - Applies any changes made under the Configured Value column. If DCBX is present on the attached fabric switch, these changes are saved in non-volatile memory, but not loaded. If DCBX is not present, changes made in the Configured Value column may or may not take effect, depending on the switch's configuration. You are notified of any failures to save the configured values to the CEE adapter's non-volatile memory.
- Configure FIP - Allows you to enable or disable FIP. See “Enabling and Disabling FIP (FCoE Initialization Protocol)” for more information.

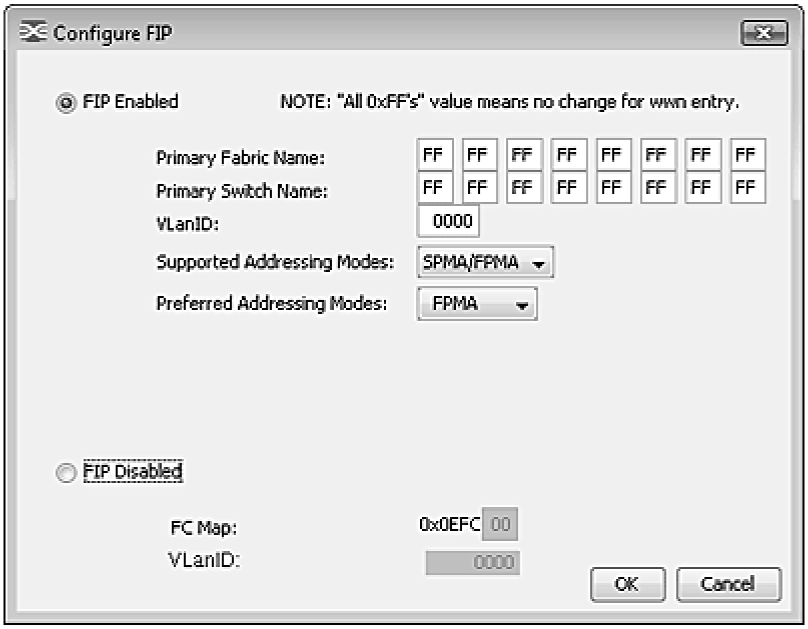
Enabling and Disabling FIP (FCoE Initialization Protocol)

When FIP Mode is enabled, the primary fabric and switch name can be entered as well as a VLAN ID. When FIP mode is disabled, the FC map value can be entered. The default FC map value is 0EFC00.

Note: Addressing modes for LP21000 series adapters are always FPMA and therefore cannot be changed.

To enable FIP:

1. From the discovery-tree, select the CEE adapter whose FIP you want to enable (such as an LP21000).
2. Select the **CEE/FCoE** tab and click **Configure FIP**. The Configure FIP dialog box appears.



● FIP Enabled

NOTE: "All 0xFF's" value means no change for wwn entry.

Primary Fabric Name: FF FF FF FF FF FF FF FF
Primary Switch Name: FF FF FF FF FF FF FF FF
VLanID: 0000
Supported Addressing Modes: SPMA/FPMA
Preferred Addressing Modes: FPMA

○ FIP Disabled

FC Map: 0x0EFC 00
VLanID: 0000

Figure 29: The Configure FIP dialog box (FIP Enabled)

3. Check **FIP Enabled**.
4. Enter the primary fabric name, switch name or VLAN ID.
5. Click **OK** to enable the FIP settings and return to the CEE/FCoE tab.

To disable FIP:

1. From the discovery-tree, select the CEE adapter you want to disable (such as an LP21000).
2. Select the **CEE/FCoE** tab and click **Configure FIP**. The Configure FIP dialog box appears.
3. Check **FIP Disabled**.
4. Use the default FC Map ID or enter a different one in the FC Map field.
5. Click **OK** to disable the FIP settings, use the FC Map ID and return to the CEE/FCoE tab.

Creating a Batch Mode Driver Parameters File

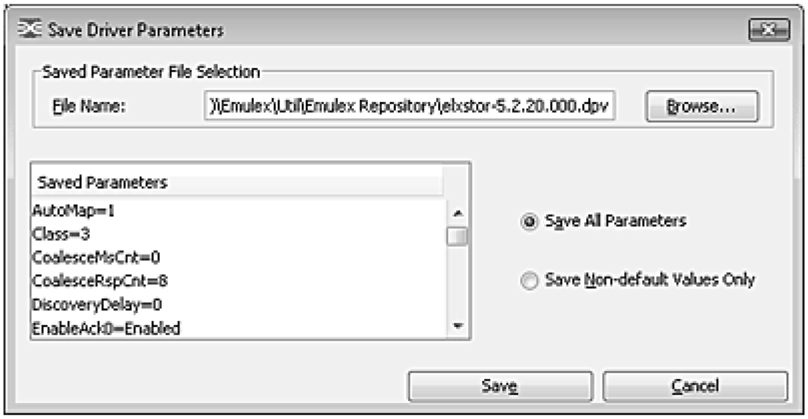
You can apply driver parameters for one adapter to other adapters in the system using the Driver Parameters tab. When you define parameters for an adapter, you create a .dpv file. The .dpv file contains parameters for that adapter. After you create the .dpv file, the HBAnyware utility enables you to assign the .dpv file parameters to multiple adapters in the system. (Not available in read-only mode.)

Note: Not supported for ESX 3.5 U2 systems.

To create the .dpv file:

1. Select **Host View** or **Fabric View.**
2. Select the adapter port whose parameters you want to apply to other adapters from the discovery-tree.
3. Select the **Driver Parameters** tab.
4. Set the driver parameters.
5. After you define the parameters for the selected adapter, click **Apply.**

6. Click **Save**. The Save Driver Parameters dialog box appears. You can save the file to a different directory or change its name.



File Name:)\Emulex\Util\Emulex Repository\elxstor-5.2.20.000.dpv

Saved Parameters

AutoMap=1
Class=3
CoalesceMsCnt=0
CoalesceRspCnt=8
DiscoveryDelay=0
EnableAck0=Enabled

● Save All Parameters

○ Save Non-default Values Only

Figure 30: Save Driver Parameters dialog box

7. Use the two radio buttons to choose the type of parameters to save. You can save all parameters or only those parameters whose current values differ from their corresponding default values.

   A list of the saved parameters and their current values show in the Saved Parameters box.

8. Click **Save**.

Assigning Batch Mode Parameters

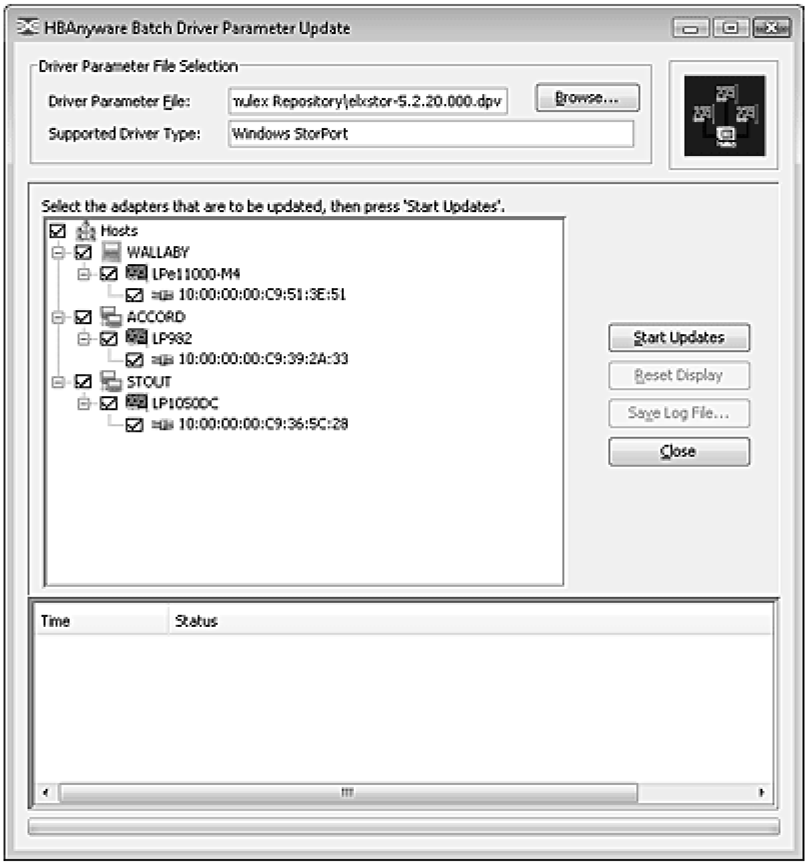
Note: Not supported on VMware ESX 3.5 versions prior to Update 4 and VMware ESX 3i Update 4.

To assign batch mode parameters to adapters:

1. From the **Batch** menu, select **Update Driver Parameters**. (You do not need to select any discovery-tree elements at this time.)
2. When the Batch Driver Parameter Update dialog box appears, click **Browse.**
3. The Driver Parameter File Selection dialog box appears. Select the file you want to use and click **OK**. A dialog box appears notifying you that the HBAnyware utility is searching for compatible adapters.

   Once compatible adapters are found, the Driver Parameter File field of the Batch Driver Parameter Update dialog box displays the selected file's path. The “Supported Models” text field displays a list of all adapter models that are compatible with the selected file. The set of compatible adapters appears in the dialog box’s discovery-tree.

   Checkboxes next to the host and adapter entries are used to select or deselect an entry. Checking an adapter selects or removes that adapter; checking a host removes or selects all eligible adapters for that host.



HBAnyware Batch Driver Parameter Update

Driver Parameter File Selection

Driver Parameter File: mulex Repository\elxstor-5.2.20.000.dpv

Supported Driver Type: Windows StorPort

Select the adapters that are to be updated, then press 'Start Updates'.

- ☑ Hosts
  - ☑ WALLABY
    - ☑ LPe11000-M4
      - ☑ 10:00:00:00:C9:51:3E:51
  - ☑ ACCORD
    - ☑ LP982
      - ☑ 10:00:00:00:C9:39:2A:33
  - ☑ STOUT
    - ☑ LP1050DC
      - ☑ 10:00:00:00:C9:36:5C:28

Time	Status

Figure 31: Batch Driver Parameters Update dialog box for Windows

4. Make your selections and click **Start Update**. The HBAnyware Batch Driver Parameter Update dialog box shows the current status of the update. When the update completes, a final summary shows the number of adapters that were successfully processed, and the number of adapters for which one or more parameter updates failed.

5. If you want, click **Save Log File** to save a report of the update.

Changing Adapter Port Names

The HBAnyware utility enables you to change adapter port names. (Not available in read-only mode.)

For example, you may want to identify a particular adapter port with the function it supports, such as a tape drive, scanner, or some other device. Use any characters you want for names, and names can be up to 255 characters in length. You can also revert to the adapter's default name.

Note: Although you can change the adapter port’s displayed name from the default WWN, the change occurs in the discovery-tree only. The WWN is still active, it is simply replaced for display purposes with the name you enter. For example, the Port WWN field of the Port Information tab is not changed. Also, any change you make to the adapter port names in your discovery-tree are seen only by you; users running the HBAnyware utility on another host do not see your name changes.

To change the name of an adapter:

1. From the discovery-tree, select the port whose name you want to change.
2. Do one of the following:
    - Select **Edit Name** from the **Adapter** menu.
    - From the discovery-tree, right-click the port whose name you want to change and select **Change Name**.
3. Edit the port name in the discovery-tree.

To use the adapter port’s default name:

1. From the discovery-tree, select the port whose name you want to change.
2. Do one of the following:
    - Select **Use Default Name** from the **Adapter** menu.
    - From the discovery-tree, right-click the port whose name you want to change and select **Restore Default Name**.

Resetting Adapter Ports

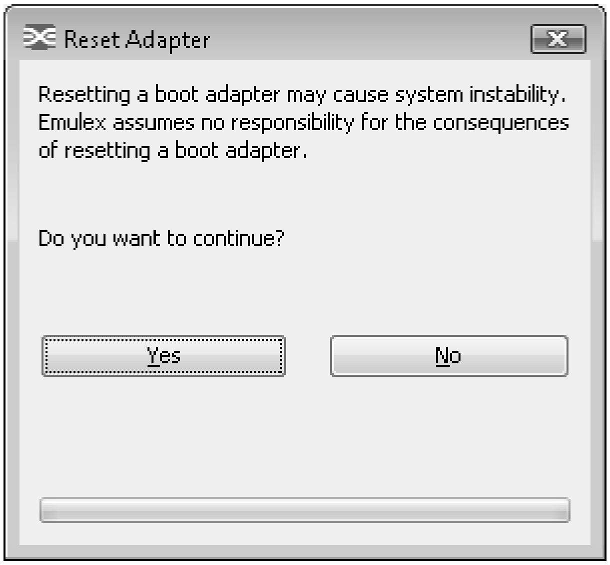
You can reset remote and local adapter ports. (Not available in read-only mode.)

Caution: Do not reset your adapter port while copying or writing files. This could result in data loss or corruption.

To reset the adapter port:

1. In the discovery-tree, select the adapter port you want to reset.
2. Do one of the following:
    - From the **Adapter** menu, click **Reset Adapter**.
    - Click the **Reset** toolbar button .

The following warning appears:



Reset Adapter

Resetting a boot adapter may cause system instability. Emulex assumes no responsibility for the consequences of resetting a boot adapter.

Do you want to continue?

Figure 32: Reset Warning

3. Click **Yes**. The adapter port resets.

   The reset can require several seconds to complete. While the adapter port is resetting, the status bar shows “Reset in progress.” When the reset is finished, the status bar shows “Reset Completed”.

Changing World Wide Name Configuration

The Maintenance tab enables you to change the World Wide Port Name (WWPN) and the World Wide Node Name (WWNN) of a selected adapter port. For example, you might want to use an installed adapter as a standby in case another installed adapter fails. By changing the standby adapter's WWPN or WWNN it can assume the identity and configuration (e.g. driver parameters, persistent binding settings, etc.) of the failed adapter.

There are three options for referencing WWNs:

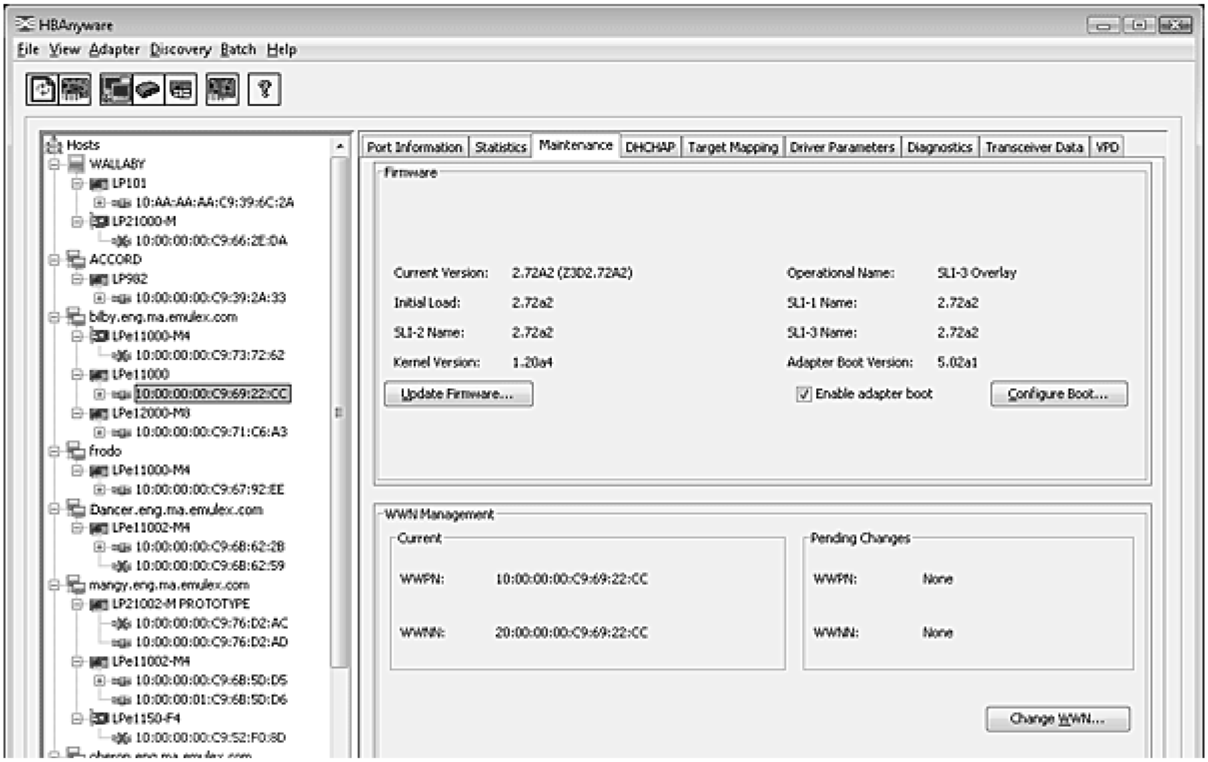
- Factory Default WWN - As shipped from the factory.
- Non-Volatile WWN - Values that are saved in non-volatile adapter’s flash memory that survives a reboot and/or power outage.
- Volatile WWN - A temporary value that is saved in volatile memory on the flash. If volatile WWNs are set, they are used instead of the non-Volatile WWNs.
  - Volatile WWN changes require a warm system reboot in order to take effect. Volatile WWN changes will be lost on systems that power cycle the adapters during the reboot.
  - Changing volatile WWNs will result in taking the selected adapter offline. Ensure that this adapter is not controlling a boot device and all I/O activity on this adapter has stopped before proceeding. Emulex assumes no responsibility for the consequences of making volatile WWN changes on a boot adapter.

Note: To avoid address conflicts, do not assign a WWNN or WWPN with the HBAnyware utility if you also use another address management tool.

Note: The Change WWN button is disabled for adapters selected on remote hosts running older versions of the HBAnyware utility. The WWPN and WWNN in the Pending Changes area show “n/a” instead of “none”. This also happens when the remote host is busy processing some critical task and WWN Management cannot obtain the current state of WWN management.

To change a port's WWPN or WWNN:

1. Do one of the following:
   - From the **View** menu, click **Hosts**.
   - From the toolbar, click 🖥 **Host View**.
2. In the discovery-tree, select the port whose information you want to change.
3. Select the **Maintenance** tab.



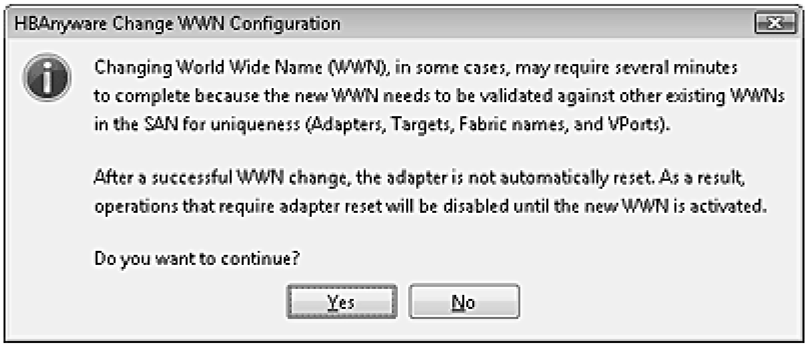
Current Version: 2.72A2 (Z3D2.72A2)
Initial Load: 2.72a2
SLI-2 Name: 2.72a2
Kernel Version: 1.20a4
Operational Name: SLI-3 Overlay
SLI-1 Name: 2.72a2
SLI-3 Name: 2.72a2
Adapter Boot Version: 5.02a1
☑ Enable adapter boot

Current
WWPN: 10:00:00:00:C9:69:22:CC
WWNN: 20:00:00:00:C9:69:22:CC

Pending Changes
WWPN: None
WWNN: None

Figure 33: Maintenance tab

4. Click **Change WWN**. The following warning appears:



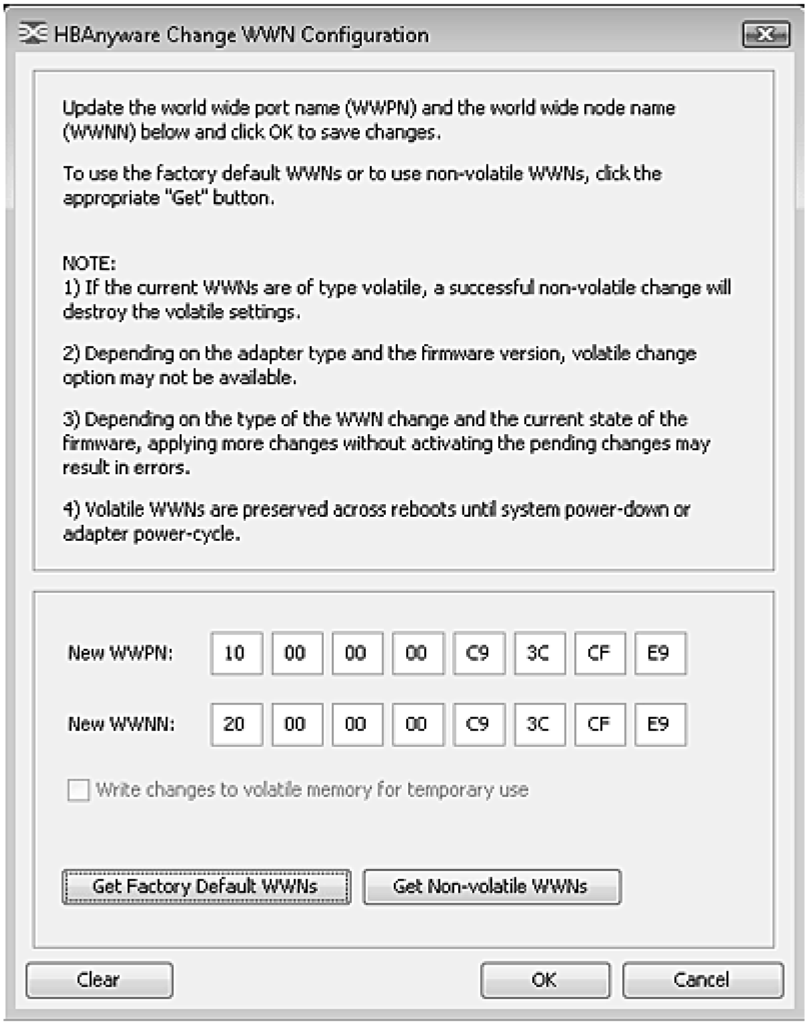
Changing World Wide Name (WWN), in some cases, may require several minutes to complete because the new WWN needs to be validated against other existing WWNs in the SAN for uniqueness (Adapters, Targets, Fabric names, and VPorts).

After a successful WWN change, the adapter is not automatically reset. As a result, operations that require adapter reset will be disabled until the new WWN is activated.

Do you want to continue?

Figure 34: Warning About Changing WWN

5. Click **Yes**. The Change World Wide Name Configuration dialog box appears.



Update the world wide port name (WWPN) and the world wide node name (WWNN) below and click OK to save changes.

To use the factory default WWNs or to use non-volatile WWNs, click the appropriate "Get" button.

NOTE:
1) If the current WWNs are of type volatile, a successful non-volatile change will destroy the volatile settings.

2) Depending on the adapter type and the firmware version, volatile change option may not be available.

3) Depending on the type of the WWN change and the current state of the firmware, applying more changes without activating the pending changes may result in errors.

4) Volatile WWNs are preserved across reboots until system power-down or adapter power-cycle.

New WWPN: 10 00 00 00 C9 3C CF E9

New WWNN: 20 00 00 00 C9 3C CF E9

□ Write changes to volatile memory for temporary use

Figure 35: Change World Wide Name Configuration dialog box

6. Do one of the following:
   - Enter a new WWPN and/or WWNN.
   - Click **Get Factory Default WWNs** to load the settings that were assigned when the adapter was manufactured to the New WWPN and WWNN settings. These values can then be modified if desired and saved as Volatile or Non-Volatile WWNs.
   - Click **Get Non-Volatile WWNs** to load the current Non-Volatile WWN settings to the New WWPN and WWNN settings. These values can then be modified if desired and saved to volatile or non-volatile memory.You can edit the data returned from the button.
7. Check **Write changes to volatile memory for temporary use** to save the New WWPN and New WWNN settings as Volatile WWNs. If unchecked, the New WWPN and New WWNN settings are saved as Non-Volatile WWNs.

Note: If the adapter or firmware does not support Volatile WWNs, the “Write changes to volatile memory for temporary use” checkbox is disabled. This type of change is supported locally and via TCP/IP connections. This checkbox is disabled for remote in-band adapters regardless of adapter models and firmware version.

8. Click **OK**. The New WWPN and new WWNN values are saved for Volatile or Non-Volatile use. The new WWPN and WWNN appear in the Pending Changes section in the WWN Management area of the Maintenance tab.
9. Reboot the system for the changes to take effect. The new WWPN and WWNN will appear in the Pending Changes section of the Maintenance dialog box until the system is rebooted. After rebooting, the changes are applied and appear in the Current section of the Maintenance dialog box.

Note: For VMware ESX 3i and 4i: After changing the WWN of an adapter, you must reboot the ESX 4i system before trying to access the adapter on that system. Refer to VMware's documentation to learn how.

Note: For ESX 4.0 COS: If you are using the CIM Interface to access adapters, after changing the WWN of an adapter you must restart the CIMOM (i.e. SFCB) on the ESX 4.0 COS system before trying to access the adapter on that system. Refer to VMware's documentation to learn how to restart the CIMON.

Creating and Deleting Virtual Ports

Creating Virtual Ports

The HBAnyware utility can automatically generate the WWPN for the virtual port based on the WWPN for the physical port or you can manually type the WWPN. You can generate virtual ports on 4 Gb/s and 8 Gb/s HBAs.You cannot generate virtual ports on 1 G/bs and 2 Gb/s HBAs.

Note: Neither HBAnyware nor hbacmd can be used to create or delete virtual ports on any VMware ESX server. Whereas VMware ESX server supports NPIV, only VMware management tools can be used to create and delete virtual ports.

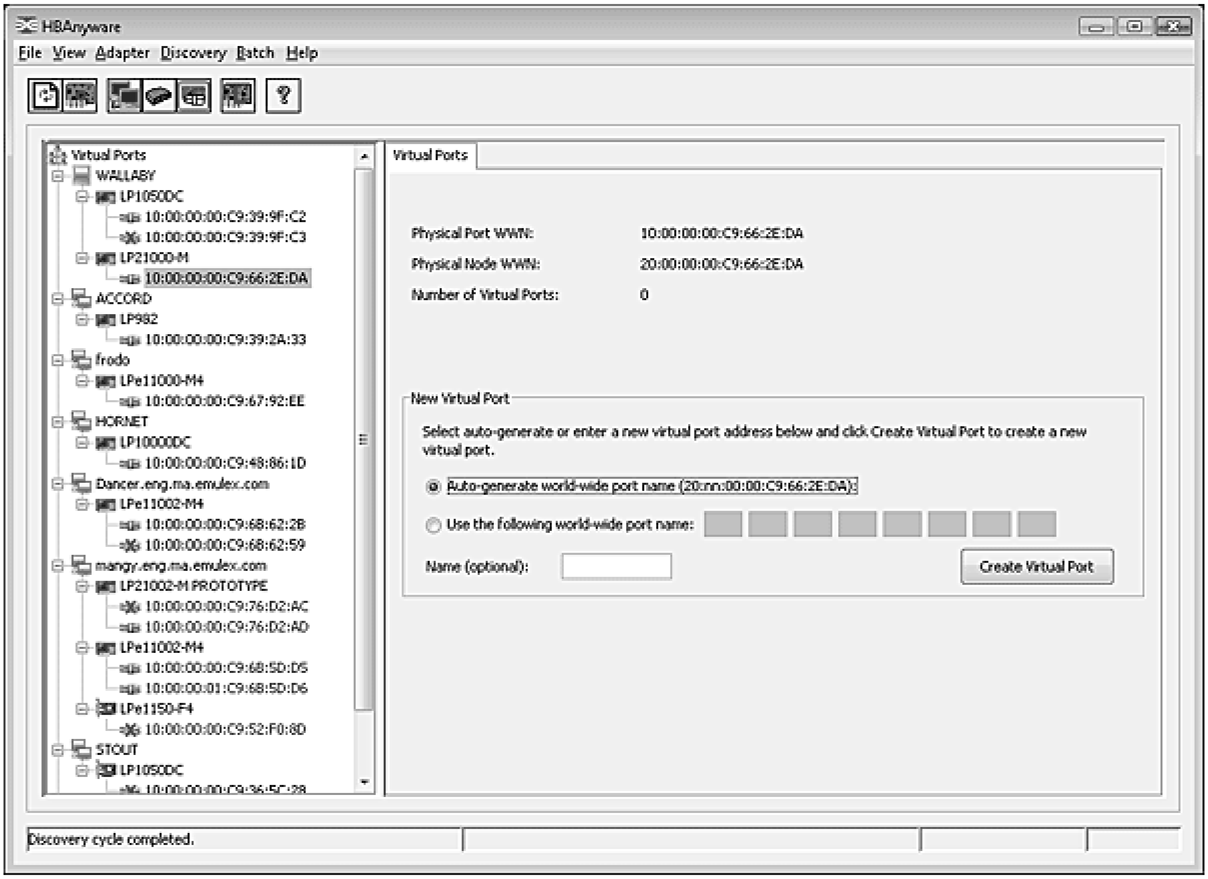
The NPIV driver parameter must be enabled before attempting to create a virtual port. The driver parameter name varies slightly depending upon your operating system:

- For Windows: enableNPIV. On the Storport Miniport system, the SLIMode driver parameter must also be set to 0 or 3.
- For Solaris: enable-npiv
- For Linux 8.2: lpfc_enable_npiv

See "Configuring the Adapter Driver" on page 50 for more information on enabling driver parameters.

To create a virtual port:

1. Do one of the following:
   - From the **View** menu, select **Virtual Ports**.
   - From the toolbar, click **Virtual Ports View**.
2. From the discovery-tree, select the adapter port on which you want to create a virtual port. The Virtual Ports tab appears.



```
Virtual Ports
  WALLABY
    LP1050DC
      10:00:00:00:C9:39:9F:C2
      10:00:00:00:C9:39:9F:C3
    LP21000-M
      10:00:00:00:C9:66:2E:DA
  ACCORD
    LP982
      10:00:00:00:C9:39:2A:33
  frodo
    LPe11000-M4
      10:00:00:00:C9:67:92:EE
  HORNET
    LP10000DC
      10:00:00:00:C9:48:86:1D
  Dancer.eng.ma.emulex.com
    LPe11002-M4
      10:00:00:00:C9:68:62:2B
      10:00:00:00:C9:68:62:59
  mangy.eng.ma.emulex.com
    LP21002-M PROTOTYPE
      10:00:00:00:C9:76:D2:AC
      10:00:00:00:C9:76:D2:AD
    LPe11002-M4
      10:00:00:00:C9:68:5D:D5
      10:00:00:01:C9:68:5D:D6
    LPe1150-F4
      10:00:00:00:C9:52:F0:8D
  STOUT
    LP1050DC
      10:00:00:00:C9:36:5C:28
```

Physical Port WWN: 10:00:00:00:C9:66:2E:DA

Physical Node WWN: 20:00:00:00:C9:66:2E:DA

Number of Virtual Ports: 0

New Virtual Port

Select auto-generate or enter a new virtual port address below and click Create Virtual Port to create a new virtual port.

● Auto-generate world-wide port name (20:nn:00:00:C9:66:2E:DA):

○ Use the following world-wide port name:

Name (optional):

Discovery cycle completed.

Figure 36: Virtual Ports tab

3. Do one of the following:
   - Check **Auto-generate world wide port name**. The HBAnyware utility creates the unique WWPN for the new virtual port based on the WWPN of the physical port. This option allows you to automatically create up to 255 unique virtual ports for each physical port. It also has the advantage that the new WWPN is unique.

Note: After auto-generating 255 unique virtual ports, you cannot auto-generate any more virtual ports even if you delete existing auto-generated ports. However, you can still enter your own World-Wide Port Name to create a virtual port.”

   - Check **Use the following world-wide port name** and enter a unique WWPN you want to use. You can create as many virtual ports as you want. A valid port name must have one of the following formats:

```
10:00:xx:xx:xx:xx:xx:xx
2x:xx:xx:xx:xx:xx:xx:xx
3x:xx:xx:xx:xx:xx:xx:xx
5x:xx:xx:xx:xx:xx:xx:xx
```

where x is a hexadecimal value.

Caution: Ensure that a manually entered WWPN is unique to your particular SAN. Failure to do so could result in a non-functioning SAN and data loss.

4. Enter an optional name for the virtual port if you want. You can give the new virtual port any name you want up to 99 characters in length. This name is used as part of the Symbolic Node Name for the VPort.
5. Click **Create Virtual Port**. A dialog box appears notifying you that the virtual port was created. The dialog box also displays the new virtual port's WWPN. Each virtual port has its own WWPN, but its WWNN is the same as the physical port's WWNN.

   Note: If you entered a WWPN that is already in use, you are prompted to enter another WWPN.

6. Click **OK**. The new virtual port is added to the discovery-tree under the physical port where it was created and the Number of Virtual Ports field is updated.

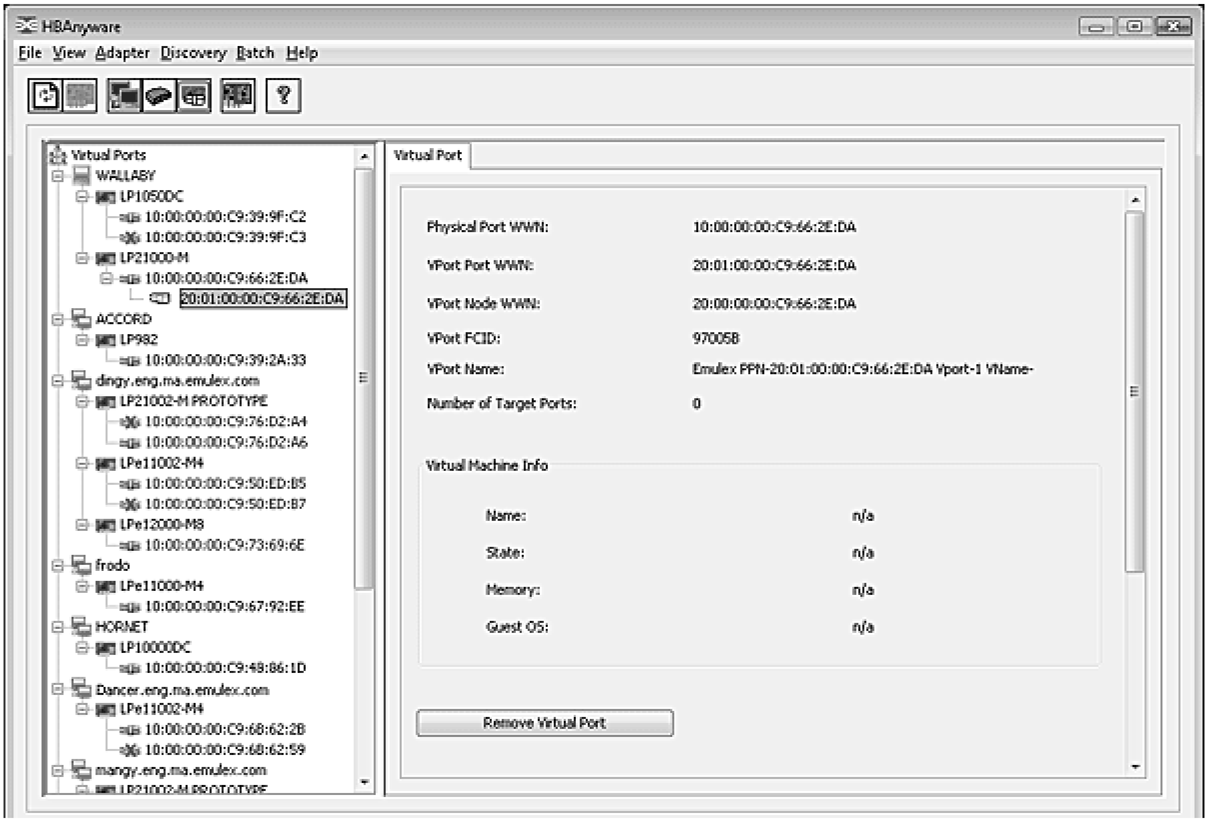
   Note: The HBAnyware utility automatically refreshes its discovery after a virtual port is created. However, targets for a new virtual port may not be discovered during the refresh. Therefore, you must refresh the discovery until the targets appear under the virtual port in the discovery-tree.

Deleting Virtual Ports

Note: Neither HBAnyware nor hbacmd can be used to create or delete virtual ports on any VMware ESX server. Whereas VMware ESX server supports NPIV, only VMware management tools can be used to create and delete virtual ports.

To delete a virtual port:

1. Do one of the following:
   - From the **View** menu, select **Virtual Ports**.
   - From the toolbar, click ▦ **Virtual Ports View**.
2. From the discovery-tree, select the virtual port you want to delete. The Virtual Ports tab appears.



Physical Port WWN: 10:00:00:00:C9:66:2E:DA

VPort Port WWN: 20:01:00:00:C9:66:2E:DA

VPort Node WWN: 20:00:00:00:C9:66:2E:DA

VPort FCID: 97005B

VPort Name: Emulex PPN-20:01:00:00:C9:66:2E:DA Vport-1 VName-

Number of Target Ports: 0

Virtual Machine Info

Name: n/a

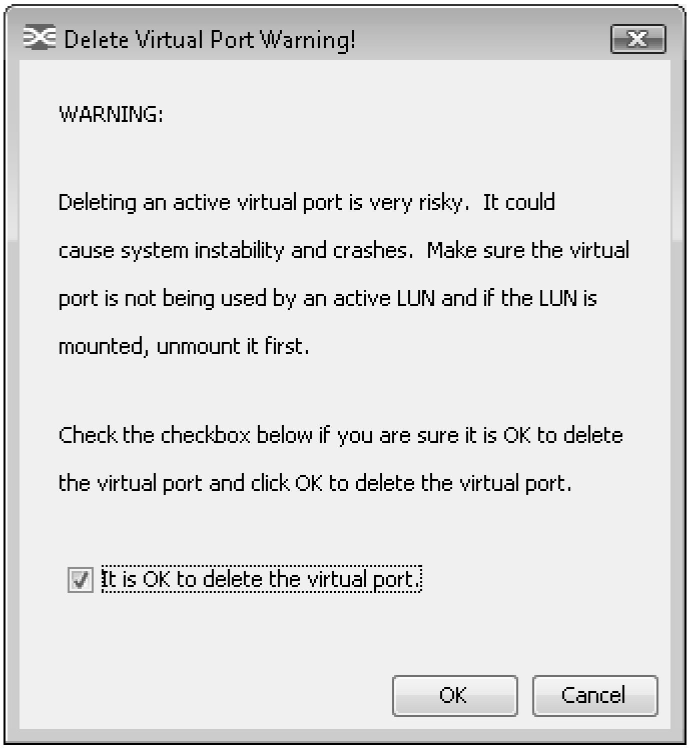
State: n/a

Memory: n/a

Guest OS: n/a

Figure 37: Virtual Port tab

3. Click **Remove Virtual Port.** The Delete Virtual Port Warning dialog box appears.


Delete Virtual Port Warning!

WARNING:

Deleting an active virtual port is very risky. It could cause system instability and crashes. Make sure the virtual port is not being used by an active LUN and if the LUN is mounted, unmount it first.

Check the checkbox below if you are sure it is OK to delete the virtual port and click OK to delete the virtual port.

☑ It is OK to delete the virtual port.

Figure 38: Delete Virtual Port Warning

Note: The link on the physical port must be up to delete a virtual port. The Remove Virtual button on the Virtual Port window is disabled if the link is down.

4. Check **It is OK to delete the virtual port** and click **OK**. You are notified that the virtual port is no longer available and that it was removed from the discovery-tree.
5. Click **OK**.

Using FC-SP DHCHAP Authentication (Windows, Linux 8.2 and Solaris SFS)

Use the DHCHAP tab to view and configure FC-SP DHCHAP (Diffie-Hellmann Challenge Handshake Authentication Protocol). You can authenticate an adapter to a switch.

Note: DHCHAP is available only for physical ports, not for virtual ports.

Note: DHCHAP is not supported on COMSTAR ports.

Once DHCHAP has been activated and configured, manually initiate authentication per adapter by clicking on the Initiate Authentication button or by inducing a fabric login (FLOGI) time per the FC-SP standard to the switch. A FLOGI can also be caused by bringing the link between the switch and adapter down and then up. (Not available in read-only mode.)

Authentication must be enabled at the driver level. Authentication is disabled by default. To enable DHCHAP using the Drivers Parameters tab, enable one of the following parameters: enable-auth (in Windows), enable-auth (Solaris SFS) or enable-auth (in Linux 8.2).

Note: The authentication driver parameters are only available on local hosts. The HBAnyware GUI will not display this driver parameter for any remote hosts.

Linux Considerations

To activate FC-SP/Authentication between the adapter host port and fabric F_Port using DHCHAP, you modify the DHCHAP-associated driver properties in the driver configuration file.

The Emulex driver for Linux version 8.2.0.x supports MD5 and SHA-1 hash functions and supports the following DH groups: Null, 1024, 1280, 1536, and 2048.

Note: This version of the driver supports for N-Port to F-Port authentication only and does not support N-Port to N-Port authentication.

Enabling Authentication

Enabling authentication is a two step process. To enable authentication:

- The fcauthd daemon must be running.
- The lpfc_enable_auth module parameter must be set to enabled.

The lpfc_enable_auth Module Parameter

Use the lpfc_enable_auth module parameter to enable or disable authentication support. This module parameter can be set when loading the driver to enable or disable authentication on all Emulex adapters in the system, or it can be set dynamically after the driver is loaded to enable or disable authentication for each port (physical and virtual). The default setting for the lpfc-enable-auth module parameter is disabled.

The fcauthd Daemon

The Emulex LPFC driver requires the fcauthd daemon to perform authentication tasks for it. To enable authentication you must have this daemon running. If you want to load the driver with authentication enabled, the fcauthd daemon should be running prior to driver load. The driver can start with authentication enabled if the daemon is not running, but all ports are placed into an error state. When the daemon is started the driver should discover the daemon and reset the adapter to enable the driver to perform authentication. To test if this daemon is running, start the daemon, or stop the daemon, you must use the /etc/init.d/fcauthd script. This script accepts the standard daemon parameters: start, stop, reload, status, restart, and condrestart.

The script syntax is /etc/init.d/fcauthd <parameter>.

Note: The 8.2.0.X driver connects directly to the fcauthd daemon. To unload the driver you must first stop the fcauthd daemon. This will close the netlink connection and allow the LPFC driver to unload.

fcauthd Daemon Parameters

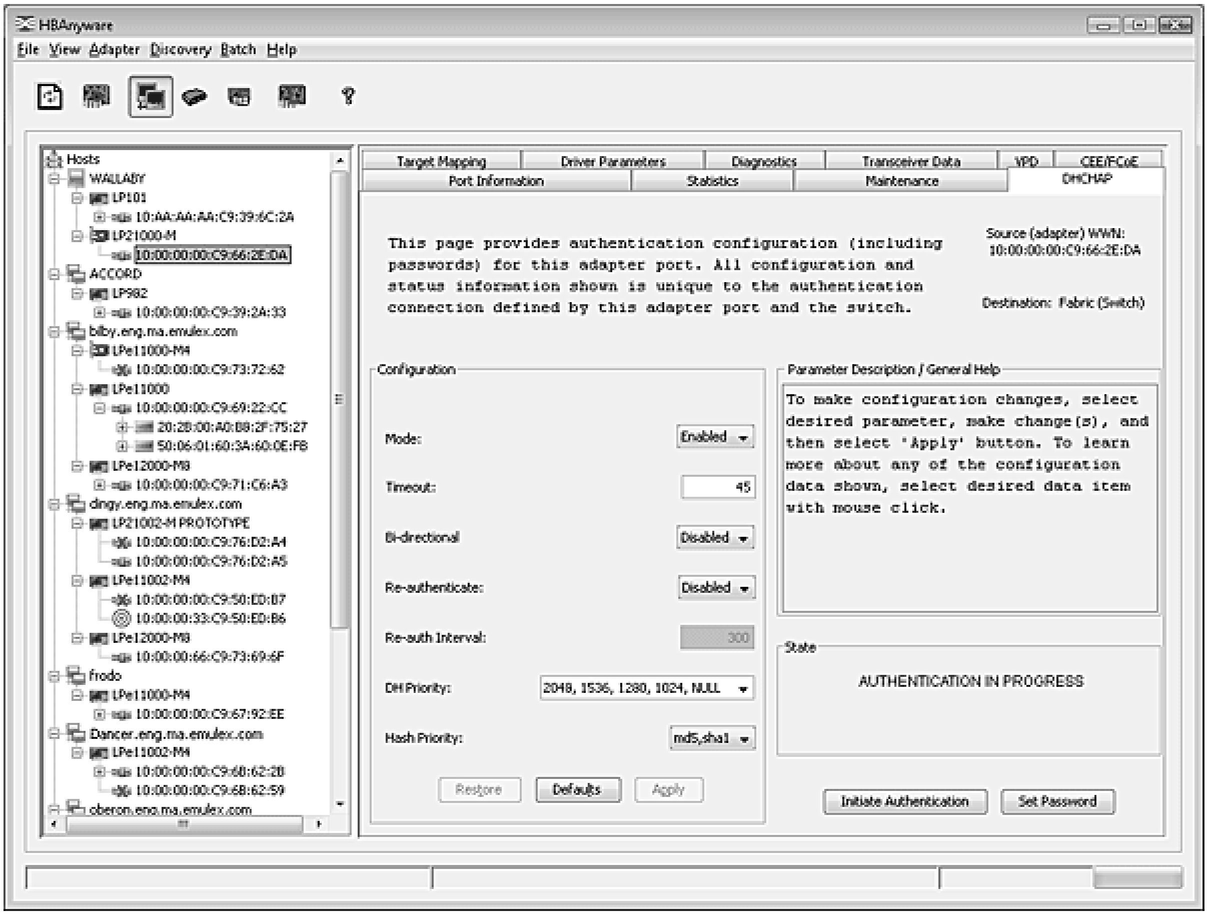
The fcauthd daemon supports the following parameters:

- start - To start the fcauthd daemon pass the start command to the fcauthd script. This command loads the daemon into memory, opens a netlink connection to the driver, and reads the authentication configuration database into memory for use by the LPFC driver.
- stop - To stop the fcauthd daemon pass the stop command to the fcauthd script. This commmand takes down the netlink connection between the fcauthd daemon and the LPFC driver, and stops the fcauthd daemon.
- reload - The reload command reloads the authentication configuration database into memory. This is done whenever the database is changed by another application (HBAnyware) or by you. If the database is changed the new configuration information is not used until the fcauthd daemon reloads the database.

- status - This command is used to display the current status of the fcauthd daemon. The status should be either running or stopped.
- restart - The restart command performs a stop and then a start.
- condrestart - The conditional restart command checks the status of the fcauthd daemon. If it is running it issues a stop and then a start command. If the fcauthd daemon is not running nothing happens.

The DHCHAP Tab

The DHCHAP tab enables you to configure authentication.



This page provides authentication configuration (including passwords) for this adapter port. All configuration and status information shown is unique to the authentication connection defined by this adapter port and the switch.

Source (adapter) WWN: 10:00:00:00:C9:66:2E:DA

Destination: Fabric (Switch)

Mode: Enabled

Timeout: 45

Bi-directional Disabled

Re-authenticate: Disabled

Re-auth Interval: 300

DH Priority: 2048, 1536, 1280, 1024, NULL

Hash Priority: md5,sha1

To make configuration changes, select desired parameter, make change(s), and then select 'Apply' button. To learn more about any of the configuration data shown, select desired data item with mouse click.

AUTHENTICATION IN PROGRESS

Figure 39: DHCHAP tab

DHCHAP Tab Field Definitions

- Source - The WWPN of the adapter port.
- Destination - The fabric (switch).

Configuration Data Area

- Mode - The mode of operation. There are three modes: Enabled, Passive and Disabled.
  - Enabled - The adapter initiates authentication after issuing an FLOGI to the switch. If the connecting device does not support DHCHAP authentication, the software will still continue with the rest of the initialization sequence.

- Passive - The adapter does not initiate authentication, but participates in the authentication process if the connecting device initiates an authentication request.
- Disabled - The adapter does not initiate authentication or participate in the authentication process when initiated by a connecting device. This is the default mode.

- Timeout - During the DHCHAP protocol exchange, if the switch does not receive the expected DHCHAP message within a specified time interval, authentication failure is assumed (no authentication is performed). The time value ranges from 20 to 999 seconds.
- Bi-Directional - If selected, the adapter driver supports authentication initiated by either the switch or the adapter. If this checkbox is clear, the driver supports adapter initiated authentication only.
- Re-authenticate - If selected, the driver can periodically initiate authentication.
- Re-auth Interval - The value in minutes that the adapter driver uses to periodically initiate authentication. Valid interval ranges are 10 to 3600 minutes. The default is 300 minutes.
- DH Priority - The priority of the five supported DH Groups (Null group, and groups 1,2,3, and 4) that the adapter driver presents during the DHCHAP authentication negotiation with the switch.
- Hash Priority - The priority of the two supported hash algorithms (MD5 and SHA1) that the adapter driver presents during the DHCHAP authentication negotiation with the switch (default is MD5 first, then SHA1,2,3...).
- State - Possible states are Not Authenticated, Authentication In Progress, Authentication Success and Authentication Failed.

Changing Authentication Configuration

To view or change authentication configuration:

1. In the discovery-tree, select the adapter whose configuration you want to view or change.
2. Select the **DHCHAP** tab. (If the fields on this tab are “grayed out” (disabled) authentication has not been enabled at the driver level.)
3. Change configuration values as you want.

Note: You can only configure DHCHAP on the local host.

4. Click **Apply**. You are prompted for the current password (local password) to validate the configuration change request. The verification request only appears if a local password has been defined for this adapter.
5. Enter the password and click **OK**.

To return settings to the status before you started this procedure, click **Restore** before you click **Apply**. Once you click **Apply**, changes can not be cancelled.

To return all settings to the default configuration, click **Defaults**. Be careful as this also resets the password(s) to NULL for this configuration.

To initiate an immediate authentication, click **Initiate Authentication**. This request is sent to the driver, even if you have not made any changes to the setup.

Note: To successfully authenticate with the switch using DHCHAP, you only need to set the configuration mode to enabled and set the local password. The local password must be set to the identical value as the switch for the DHCHAP authentication to succeed.

Changing Your Password

To change your password:

1. From the discovery-tree, select the adapter whose password you wish to change.
2. Click **Password** on the **DHCHAP** tab. The Password dialog box is displayed.
3. Choose **Set Local Password** or **Set Remote Password**.
    - Local password is used by the adapter driver when the adapter initiates authentication to the switch (typical use).
    - Remote password is used by the adapter driver when the switch authenticates with the adapter. The latter is only possible when bi-directional has been checked on the configuration.
4. If you want to see the Password characters entered in the dialog box, check **Show Characters**.
5. Provide the current value for the password to validate the 'set new password' request (unnecessary if this is the first time the password is set for a given adapter).
6. Enter the new password.
7. Select alpha-numeric or hex format.
8. Click **OK**.

Caution: Do not forget the password once one has been assigned. Once a password is assigned to an adapter, subsequent DHCHAP configuration settings for that adapter including 'default configuration' or new passwords require you to enter the existing password to validate your request (i.e. no further changes can be made without the password).

Note: Additional help is available by clicking Help on the Set Password dialog box.

Viewing the Error and Event Log

For Solaris and Linux systems, a simple shell script checks the /var/adm/messages and /var/log/messages files respectively for recent Emulex driver DHCHAP events and outputs them to a default location.

To view the error and event log:

1. Click **Event Log History** on the **Authenticate** tab.

Updating Adapter Firmware

HBAnyware enables you to update firmware for a single adapter or simultaneously for multiple adapters.

Updating Firmware for a Single Adapter

Using the Maintenance tab, you can update firmware on local and remote adapters. The firmware file must be downloaded from the Emulex Web site and extracted to a local drive before you can perform this procedure. (Not available in read-only mode.)

- The Emulex driver must be installed.
- The HBAnyware utility must be installed.
- The firmware zip file must be downloaded from the Emulex Web site, unzipped and extracted to a folder on a local drive.

- If the adapter is already connected to a boot device, the system must be in a state in which this type of maintenance can be performed:
  - I/O activity on the Bus has been stopped.
  - Cluster software, or any other software that relies on the adapter to be available, is stopped or paused.

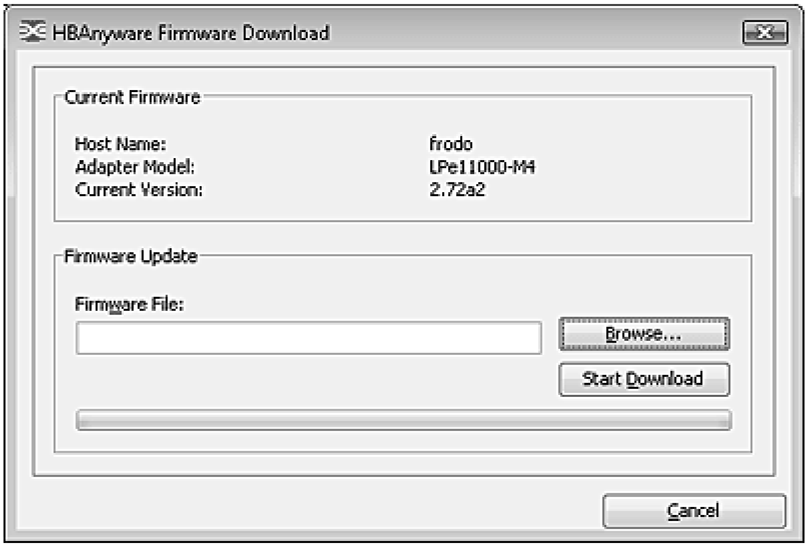
Note: For OEM branded HBAs, see the OEM’s Web site or contact the OEM’s customer service department or technical support department for the firmware files.

Note: You cannot update firmware with the HBAnyware utility on a Sun-branded adapter.

To update firmware for a single adapter:

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, click the adapter port whose firmware you want to update.
3. Select the **Maintenance** tab and click **Update Firmware**. If the warning screen appears, click **Yes.**

   The Firmware Download dialog box appears.



Host Name: frodo
Adapter Model: LPe11000-M4
Current Version: 2.72a2

Firmware File:

Figure 40: Firmware Download dialog box

4. Using the Firmware Download dialog box, navigate to the unzipped, extracted image file you want to download. The firmware image may be specified either by entering the image file's full pathname in the “Firmware File” field or by clicking the **Browse** button.

   If you click Browse the Firmware File Selection dialog box appears. Select the file you want to use and click **OK**. The Firmware Download dialog box appears.
5. Click **Start Download**. A warning dialog box appears.
6. Click **Yes**. A status bar shows the progress of the download. The adapter in the discovery-tree is displayed in black text when the update is complete.

   Note: The adapter in the discovery-tree is displayed in red text when it is offline.
7. Click **Close**. The Firmware tab displays the updated firmware information for the selected adapter.

If you are updating the firmware on a dual-channel adapter, repeat steps 1 through 7 to update the firmware on the second port or use the “Updating Firmware for Multiple Adapters” procedure.

Note: If the state of the boot code on the board has changed, this change is reflected immediately on the Port Information tab.

Updating Firmware for Multiple Adapters

Use batch mode to install firmware on multiple HBAs in a single step. Batch firmware loading is restricted to a single firmware file and to all accessible HBAs for which that file is compatible. (Not available in read-only mode).

Note: Stop other HBAnyware utility functions while batch loading is in progress.

Note: When using HBAnyware with Web Launch the firmware file must reside on the host where the browser window was launched from, not the host that was specified in Web address.

Before you can perform a batch update, the firmware file must be downloaded from the Emulex Web site and extracted to a directory on your local drive.

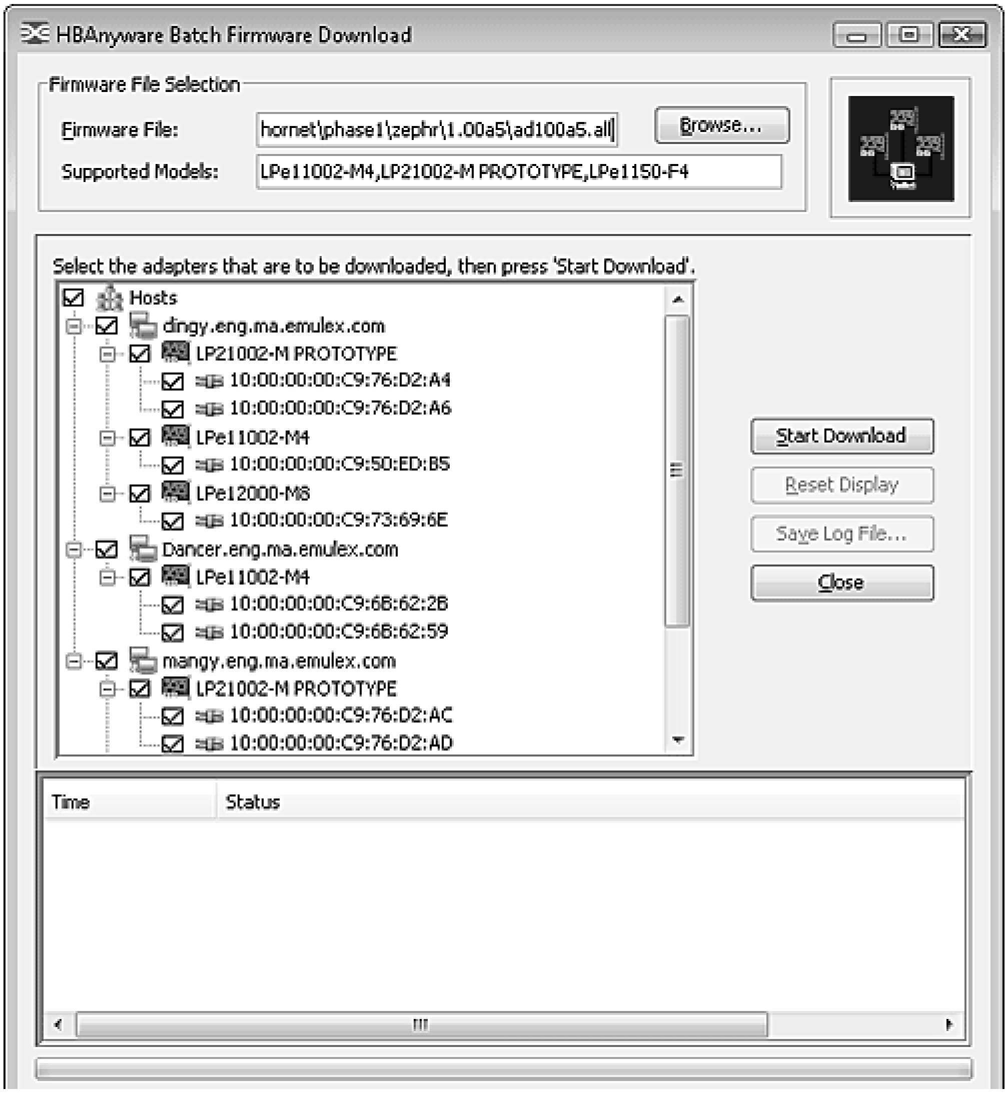
To update firmware for multiple adapters:

1. From the **Batch** menu, select **Download Firmware**.

   Note: You do not need to select a particular tree element for this operation.

2. When the Batch Firmware Download dialog box appears, click **Browse.**
3. The Firmware File Selection dialog box appears. Select the file you want to use and click **OK**. A dialog box appears notifying you that HBAnyware is searching for compatible adapters.

   Once compatible adapters are found, the “Firmware File” text area of the main Batch Download dialog displays the selected image file's path. The “Supported Models” text field displays a list of all adapter models that are compatible with the selected image file. The set of compatible adapters appears in the dialog box’s discovery-tree.



HBAnyware Batch Firmware Download

Firmware File Selection

Firmware File: hornet\phase1\zephr\1.00a5\ad100a5.all

Supported Models: LPe11002-M4,LP21002-M PROTOTYPE,LPe1150-F4

Select the adapters that are to be downloaded, then press 'Start Download'.

- ☑ Hosts
  - ☑ dingy.eng.ma.emulex.com
    - ☑ LP21002-M PROTOTYPE
      - ☑ 10:00:00:00:C9:76:D2:A4
      - ☑ 10:00:00:00:C9:76:D2:A6
    - ☑ LPe11002-M4
      - ☑ 10:00:00:00:C9:50:ED:B5
    - ☑ LPe12000-M8
      - ☑ 10:00:00:00:C9:73:69:6E
  - ☑ Dancer.eng.ma.emulex.com
    - ☑ LPe11002-M4
      - ☑ 10:00:00:00:C9:6B:62:2B
      - ☑ 10:00:00:00:C9:6B:62:59
  - ☑ mangy.eng.ma.emulex.com
    - ☑ LP21002-M PROTOTYPE
      - ☑ 10:00:00:00:C9:76:D2:AC
      - ☑ 10:00:00:00:C9:76:D2:AD

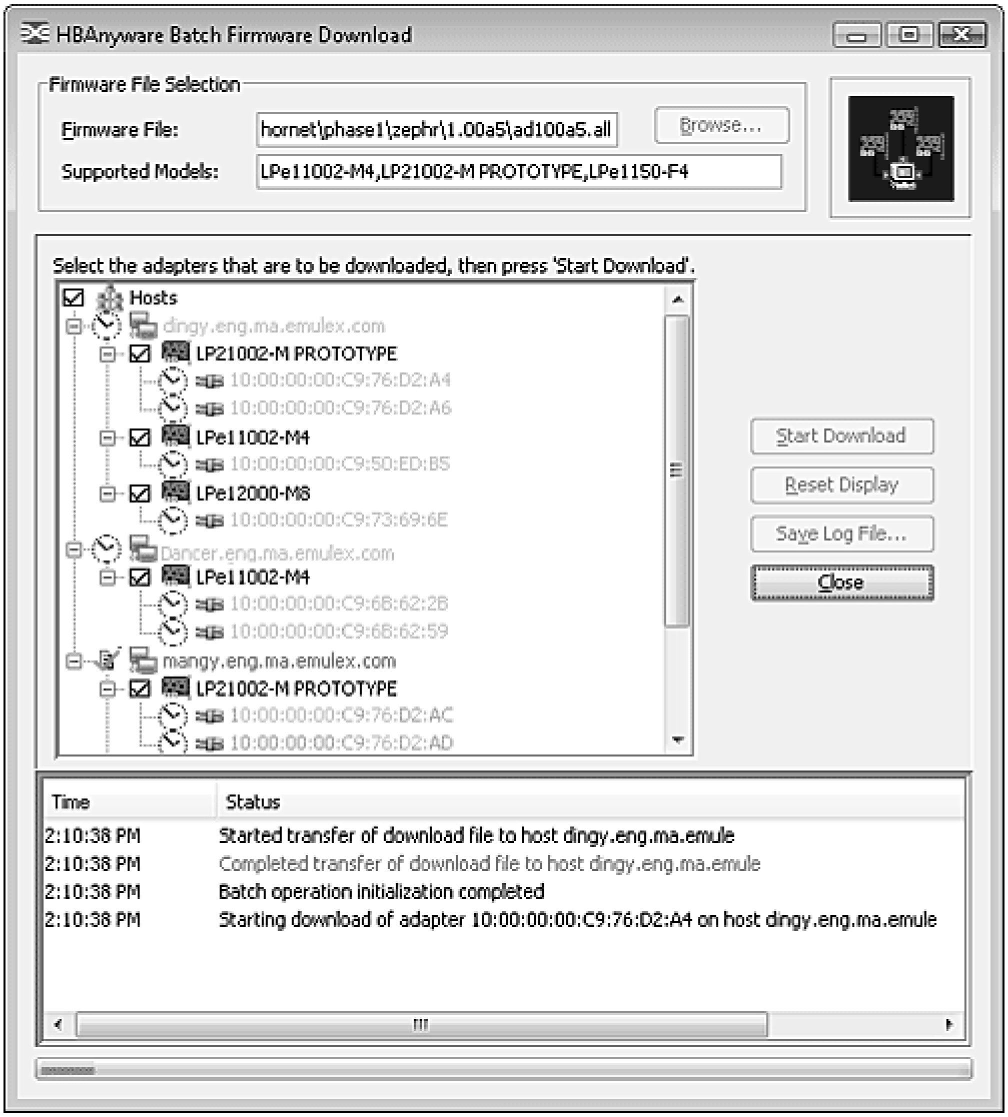
Time	Status

Figure 41: Selecting adapters to Update screen

A tree-view appears showing all adapters and their corresponding hosts for which the selected firmware file is compatible. Checkboxes next to the host and adapter entries are used to select or deselect an entry. Checking an adapter selects or removes that adapter; checking a host removes or selects all eligible adapters for that host.

4. Make your selections and click **Start Download**.

When downloading begins, the tree-view displays the progress. As firmware for a selected adapter is being downloaded, it appears orange in the tree-view. Once successful downloading is complete, the entry changes to green. If the download fails, the entry is changed to red.



Firmware File: hornet\phase1\zephr\1.00a5\ad100a5.all

Supported Models: LPe11002-M4,LP21002-M PROTOTYPE,LPe1150-F4

Select the adapters that are to be downloaded, then press 'Start Download'.

```
☑ Hosts
  dingy.eng.ma.emulex.com
    ☑ LP21002-M PROTOTYPE
        10:00:00:00:C9:76:D2:A4
        10:00:00:00:C9:76:D2:A6
    ☑ LPe11002-M4
        10:00:00:00:C9:50:ED:B5
    ☑ LPe12000-M8
        10:00:00:00:C9:73:69:6E
  Dancer.eng.ma.emulex.com
    ☑ LPe11002-M4
        10:00:00:00:C9:6B:62:2B
        10:00:00:00:C9:6B:62:59
  mangy.eng.ma.emulex.com
    ☑ LP21002-M PROTOTYPE
        10:00:00:00:C9:76:D2:AC
        10:00:00:00:C9:76:D2:AD
```

Time	Status
2:10:38 PM	Started transfer of download file to host dingy.eng.ma.emule
2:10:38 PM	Completed transfer of download file to host dingy.eng.ma.emule
2:10:38 PM	Batch operation initialization completed
2:10:38 PM	Starting download of adapter 10:00:00:00:C9:76:D2:A4 on host dingy.eng.ma.emule

Figure 42: Download Complete screen

5. When downloading is finished, you can click **Save Log File** to save copy of the activity log.
6. Click **Close** to exit the batch procedure.

Updating CEE Firmware for a Single Adapter

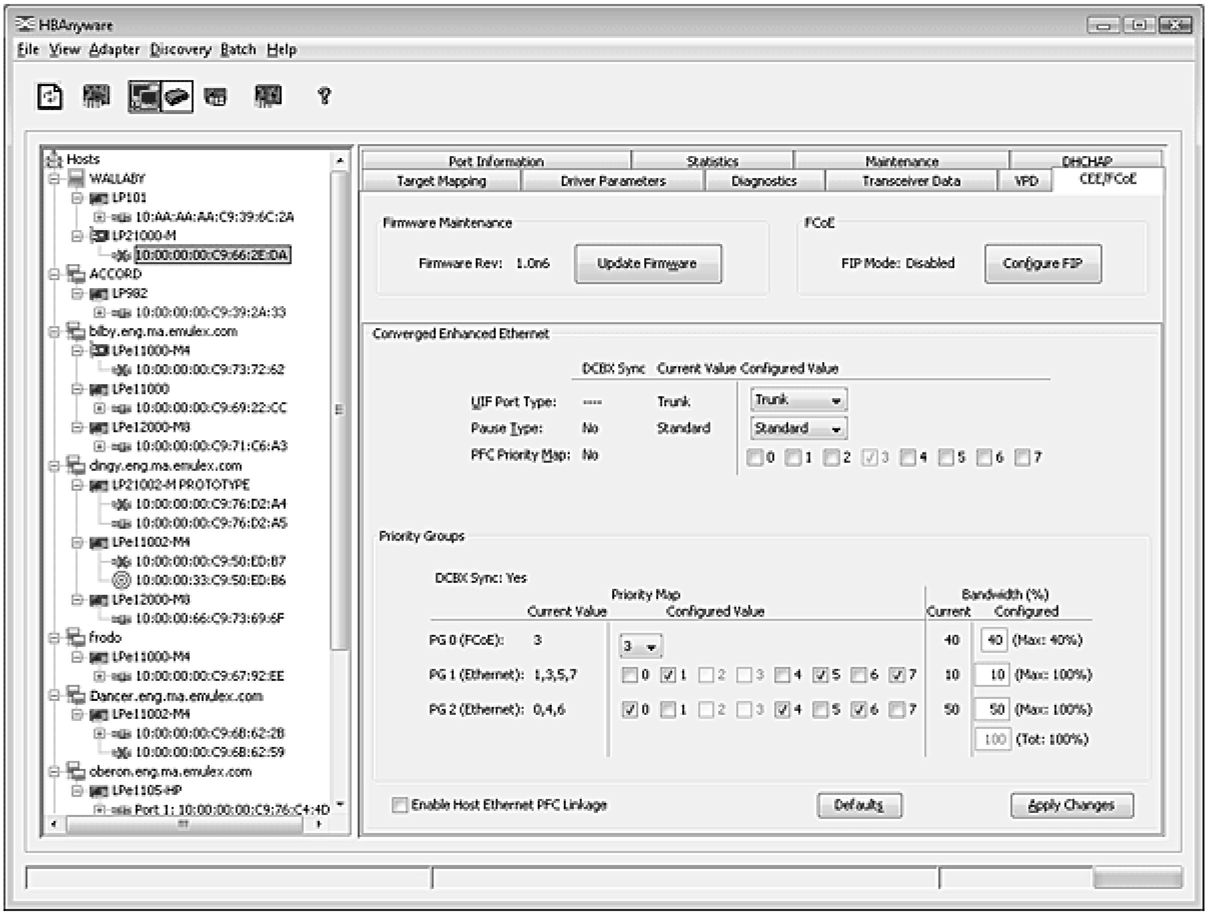
To support configuration of CNAs (Converged Network Adapters) that support FCoE devices, the HBAnyware utility version 4.1 includes a CEE/FCoE tab. This tab is only shown when a CNA is selected in the discovery-tree. The CEE/FCoE tab allows you to update firmware on the CNA port and to configure or view CEE/FCoE-specific settings.

Note: CEE firmware image filenames end with a .bin extension.

Note: CEE is not supported on VMware ESX servers being managed through the CIM interface.

To update CEE firmware to a single CNA port:

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, click the CNA port whose firmware you want to update.
3. Select the **CEE/FCoE** tab.



Firmware Maintenance

Firmware Rev: 1.0n6

FCoE

FIP Mode: Disabled

Converged Enhanced Ethernet

	DCBX Sync	Current Value	Configured Value
UIF Port Type:	----	Trunk	Trunk
Pause Type:	No	Standard	Standard
PFC Priority Map:	No		□ 0 □ 1 □ 2 ☑ 3 □ 4 □ 5 □ 6 □ 7

Priority Groups

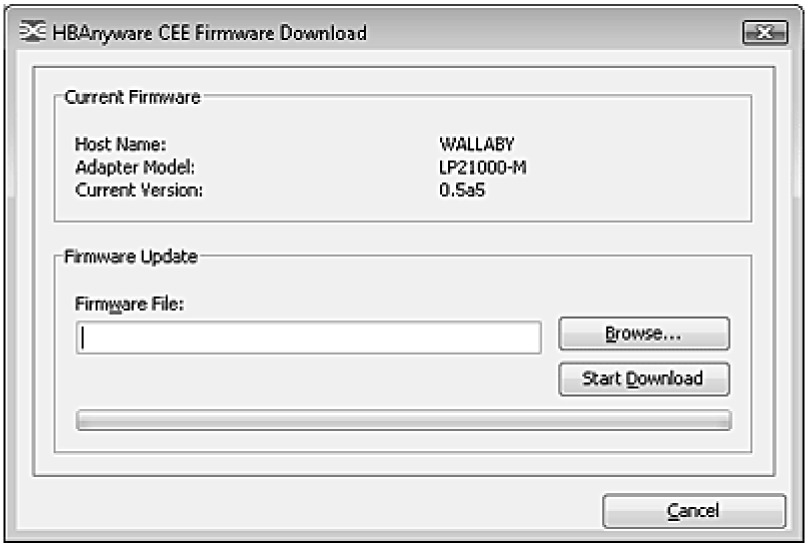
DCBX Sync: Yes

	Priority Map		Bandwidth (%)	
	Current Value	Configured Value	Current	Configured
PG 0 (FCoE):	3	3	40	40 (Max: 40%)
PG 1 (Ethernet):	1,3,5,7	□ 0 ☑ 1 □ 2 □ 3 □ 4 ☑ 5 □ 6 ☑ 7	10	10 (Max: 100%)
PG 2 (Ethernet):	0,4,6	☑ 0 □ 1 □ 2 □ 3 ☑ 4 □ 5 ☑ 6 □ 7	50	50 (Max: 100%)
				100 (Tot: 100%)

□ Enable Host Ethernet PFC Linkage

Figure 43: CEE/FCoE Tab (FIP disabled)

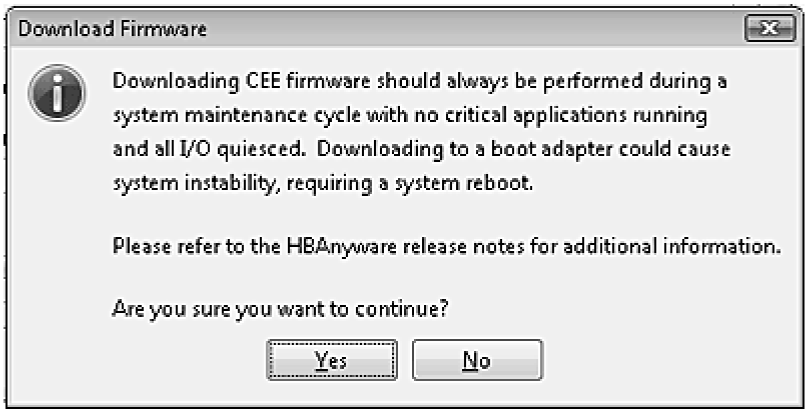
4. Click **Update Firmware**. The CEE Firmware Download dialog box is displayed.



Host Name: WALLABY
Adapter Model: LP21000-M
Current Version: 0.5a5

Figure 44: HBAnyware CEE Firmware Download dialog box

5. Specify the desired firmware image. Do one of the following in the CEE Firmware Download dialog box:
   - Type the firmware file name. There are two ways to enter the file name in the Firmware File field:
     - If the file is **not** located in the HBAnyware repository, type the full path and filename of the firmware image file.
     - If the firmware file **is** located in the HBAnyware repository, type only the filename. The HBAnyware repository can be found in the following paths:
       - `/opt/HBAnyware/RMRepository/` (Solaris)
       - `/usr/sbin/hbanyware/RMRepository/` (Linux)
       - `C:\Program Files\Emulex\Util\Emulex Repository\` (Windows)
   - Click **Browse**. Use the Firmware File Selection dialog box to locate the firmware image and click **OK**. The CEE Firmware Download dialog box is displayed with the path you just browsed to.
6. Click **Start Download** on the CEE Firmware Download dialog box. A warning message similar to the following is displayed:



Downloading CEE firmware should always be performed during a system maintenance cycle with no critical applications running and all I/O quiesced. Downloading to a boot adapter could cause system instability, requiring a system reboot.

Please refer to the HBAnyware release notes for additional information.

Are you sure you want to continue?

Figure 45: CEE Download Firmware warning

7. Click **Yes** on the Download Firmware warning. The status of the download appears on the HBAnyware Firmware Download window.

Updating CEE Firmware on Multiple Adapters

Use batch mode to install CEE firmware on multiple adapters in a single step. Batch firmware loading is restricted to a single firmware file and to all accessible adapters for which the file is compatible. (Not available in read-only mode).

Note: Stop other HBAnyware utility functions while batch loading is in progress.

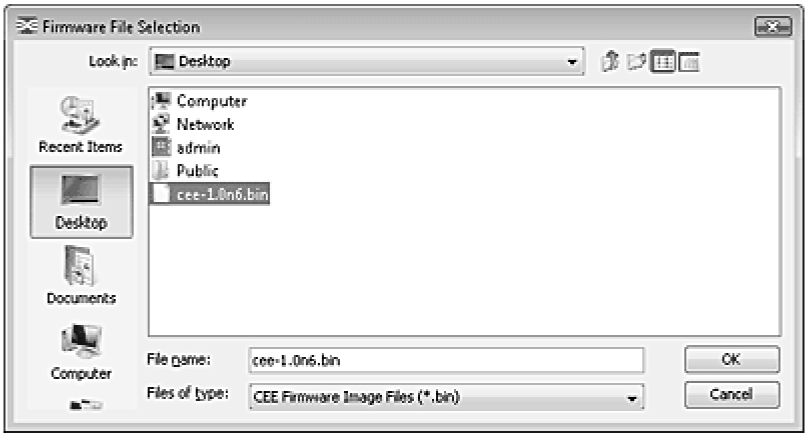
Before you can perform a batch update, the firmware file must be downloaded from the Emulex Web site and extracted to a directory on your local drive.

To update CEE firmware on multiple adapters:

1. From the **Batch** menu, select **Download CEE Firmware**. The Batch CEE Firmware Download dialog box appears.

   Note: You do not need to select a particular tree element for this operation.

2. Click **Browse**. The Firmware File Selection dialog box appears.



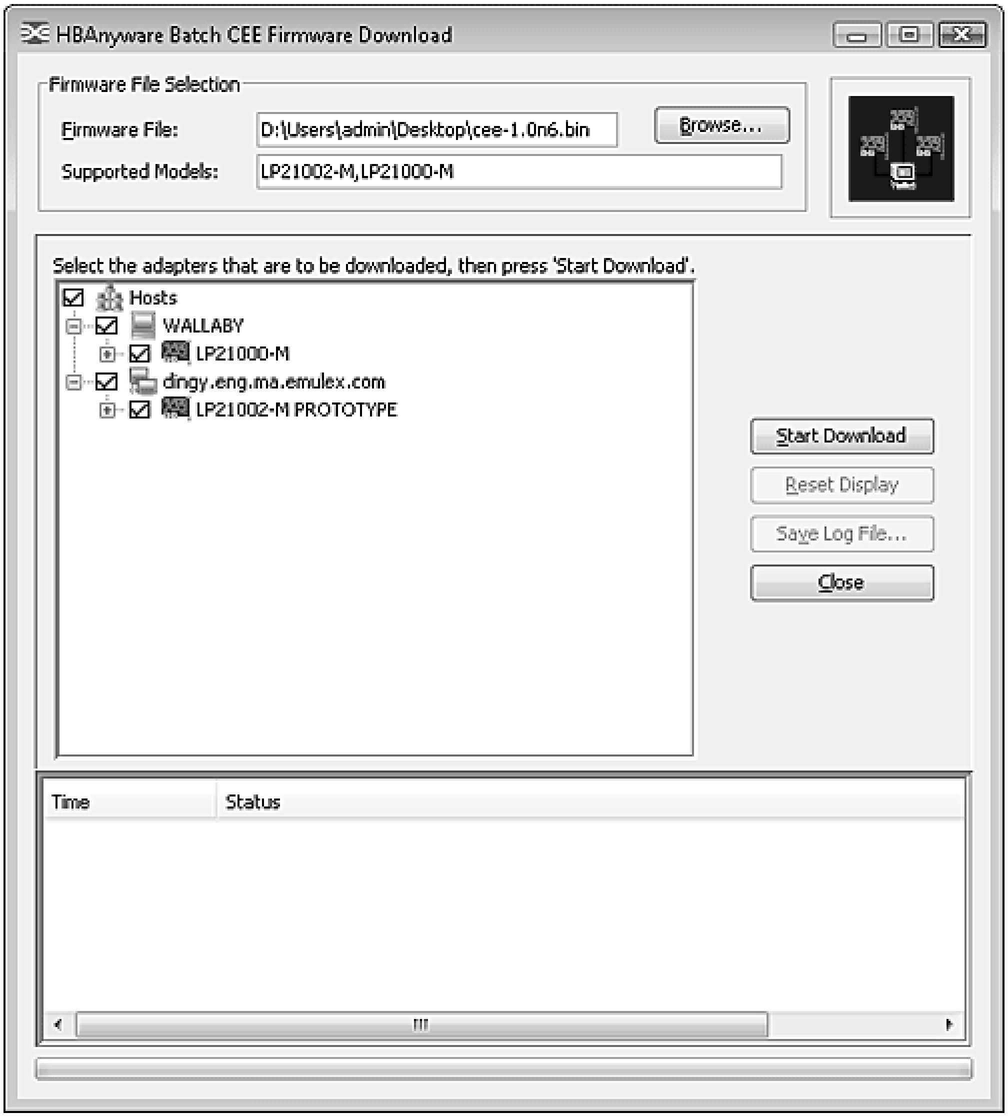
Look in: Desktop

File name: cee-1.0n6.bin

Files of type: CEE Firmware Image Files (*.bin)

Figure 46: Firmware File Selection dialog box

3. Navigate to the firmware file you want to use and click **OK**.



HBAnyware Batch CEE Firmware Download

Firmware File Selection

Firmware File: D:\Users\admin\Desktop\cee-1.0n6.bin

Supported Models: LP21002-M,LP21000-M

Select the adapters that are to be downloaded, then press 'Start Download'.

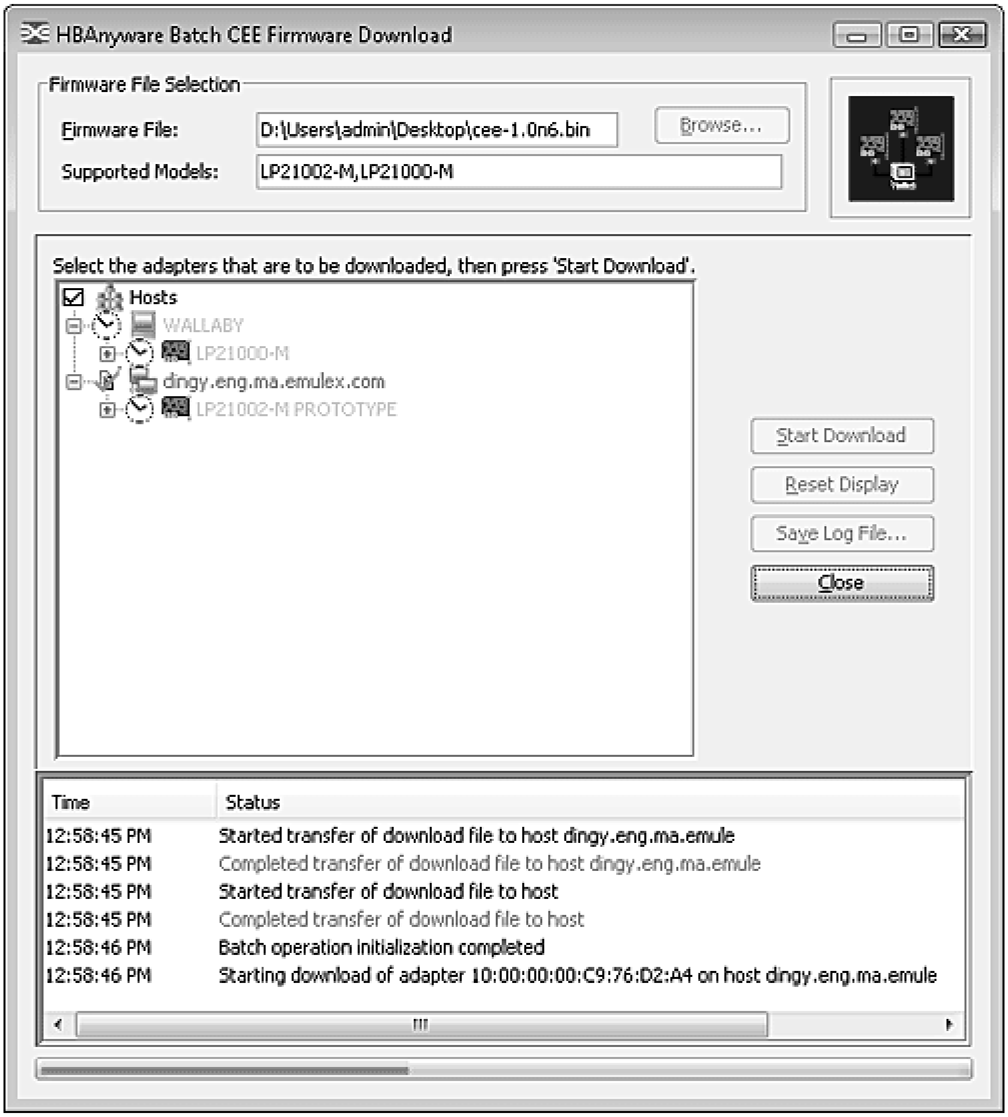
- ☑ Hosts
  - ☑ WALLABY
    - ☑ LP21000-M
  - ☑ dingy.eng.ma.emulex.com
    - ☑ LP21002-M PROTOTYPE

Figure 47: Selecting HBAs to Update screen

A tree-view appears showing all adapters and their corresponding hosts for which the selected firmware file is compatible. Checkboxes next to the host and adapter entries are used to select or deselect an entry. Checking an adapter selects or removes that adapter; checking a host removes or selects all eligible adapters for that host.

4. Make your selections and click **Start Download**.

When downloading begins, the tree-view displays the progress. As firmware for a selected adapter is being downloaded, it appears orange in the tree-view. Once successful downloading is complete, the entry changes to green. If the download fails, the entry is changed to red.


HBAnyware Batch CEE Firmware Download
Firmware File Selection
Firmware File: D:\Users\admin\Desktop\cee-1.0n6.bin
Browse...
Supported Models: LP21002-M,LP21000-M
Select the adapters that are to be downloaded, then press 'Start Download'.
Hosts
WALLABY
LP21000-M
dingy.eng.ma.emulex.com
LP21002-M PROTOTYPE
Start Download
Reset Display
Save Log File...
Close

```
Time          Status
12:58:45 PM   Started transfer of download file to host dingy.eng.ma.emule
12:58:45 PM   Completed transfer of download file to host dingy.eng.ma.emule
12:58:45 PM   Started transfer of download file to host
12:58:45 PM   Completed transfer of download file to host
12:58:46 PM   Batch operation initialization completed
12:58:46 PM   Starting download of adapter 10:00:00:00:C9:76:D2:A4 on host dingy.eng.ma.emule
```

Figure 48: Download Complete screen

5. When downloading is finished, you can click Save Log File to save copy of the activity log.
6. Click **Close** to exit the batch procedure.

Mapping and Masking

Automapping SCSI Devices (Windows)

The driver defaults to automatically mapping SCSI devices. The procedures in this section apply if the default has been changed.

To automap SCSI devices:

1. Display driver parameters for the host or adapter - select the **Driver Parameters** tab or the **Host Driver Parameters** tab.
2. Select the **AutoMap** parameter. Several fields about the parameter appear on the right side of the tab.
3. Select **Enabled**.
4. To apply your changes, click **Apply**.
5. Reboot the system for this change to take effect.

Mapping and Masking Defaults (Windows)

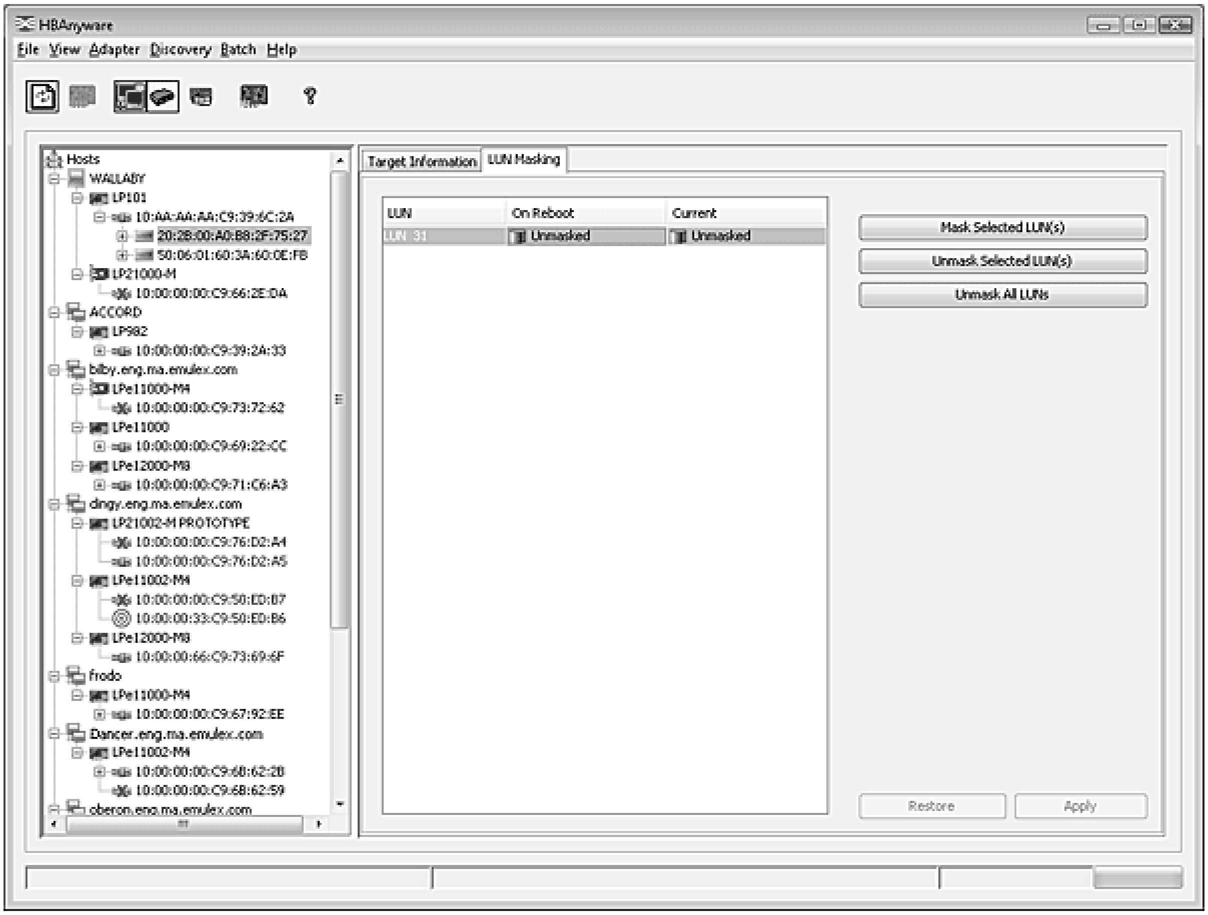
Table 3: Mapping and Masking Window Defaults

Field (Function)	Default	Description	Window
Globally Automap All Targets	Enabled	Emulex driver detects all FC devices attached to the Emulex adapters.	Global Automap
Globally Automap All LUNs	Enabled	Assigns an operating system LUN ID to a FC LUN ID for all LUNs behind all targets in the system area network.	Global Automap
Globally Unmask All LUNs	Enabled	Allows the operating system to see all LUNs behind all targets.	Global Automap
Automap All LUNs (Target Level)	Disabled	With Globally Automap All LUNs disabled, this parameter assigns an operating system LUN ID to a FC LUN ID for all LUNs behind the selected target.	LUN Mapping
LUN Unmasking (Target Level)	Disabled	Allows the operating system to see all LUNs behind the selected target. With this parameter disabled, each individual LUN can be masked or unmasked.	LUN Mapping

Masking and Unmasking LUNs (Windows)

LUN masking refers to whether or not a LUN is visible to the operating system. A LUN that has been masked is not available and is not visible to the OS. You can use the HBAnyware utility to mask or unmask LUNs at the host level.

Note: The LUN Masking tab is not shown in Virtual Port view because LUN masking is not available for virtual ports.



LUN	On Reboot	Current
LUN 31	Unmasked	Unmasked

Figure 49: LUN Masking tab

LUN Masking Conventions and Guidelines

LUN icons in the discovery-tree reflect the live mask state currently in use by the driver. Green LUN icons indicate unmasked LUNs. Gray LUN icons indicate masked LUNs. Red text indicates that a LUN mask has been changed, but not applied (saved).

LUN Masking Column Definitions

- LUN – The FC LUN number.
- On Reboot – The 'On Reboot' column shows the mask configuration currently saved to the configuration file on disk (Solaris SFS) or to the Registry (Windows). Normally, for a specific LUN, the states reported in the 'On Reboot' and 'Current' column are identical. However, there can be times where these do not match. For example, the hbacmd tool can be used to change only the 'Current' mask state for a LUN and not touch the 'On Reboot' mask state contained in the configuration file.
- Current – The 'Current' column displays the live mask state currently in use by the driver. When you first see the LUN Masking tab, the mask states displayed in the 'Current' column are identical to the mask states for the corresponding LUNs in the discovery-tree.

To change the mask status of a LUN:

1. Select **Host View**.

2. From the discovery-tree, select the SCSI target whose LUN masking state you want to change. A set of LUNs appears below the selected SCSI target.
3. Select the **LUN Masking** tab. This tab contains a list of the same set of LUNs that appear below the SCSI target in the discovery-tree.
4. In the LUN list of the LUN Masking tab, select one or more LUNs. The Mask Selected LUNs, Unmask Selected LUNs, Unmask All LUNs, Restore and Apply buttons become active as appropriate. For example, if the LUN is currently unmasked, only the Mask Selected LUNs button is active.
5. Change the mask status: click **Mask Selected LUN(s)**, **Unmask Selected LUN(s)** or **Unmask All LUNs** as appropriate. Mask status changes appear in red text.

   Note: To return all mask settings to their status before you started this procedure, click Restore before you click Apply. Once you click Apply, changes cannot be cancelled by clicking Restore. To unmask all LUNs, click Unmask All LUNs. This button is always active. Be sure to also click Apply to commit the changes.

6. Click **Apply** to commit the changes. An informational message is displayed that confirms the mask status has changed and the red text changes to black.

Using Automapping and Persistent Binding (Windows)

Set up persistent binding on remote and local adapters. Global automapping assigns a binding type, target ID, SCSI Bus and SCSI ID to the device. The binding type, SCSI Bus and SCSI ID can change when the system is rebooted. With persistent binding applied to one of these targets, the WWPN, SCSI Bus and SCSI ID remain the same when the system is rebooted. (Not available in read-only mode.)

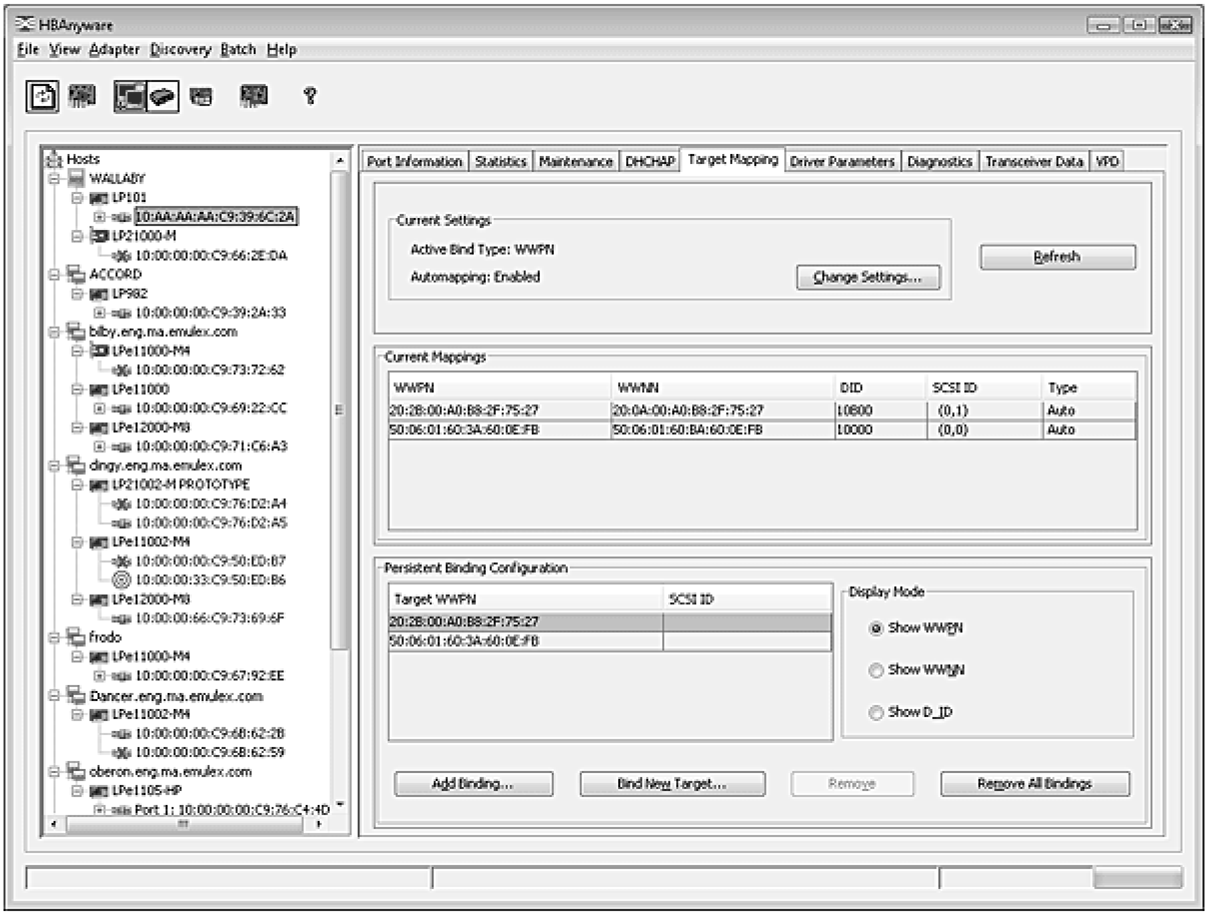
The driver refers to the binding information at during system boot. When you create a persistent binding, the HBAnyware utility tries to make that binding dynamic. However, the binding must meet all of the following criteria to be dynamic:

- The SCSI ID (target/bus combination) specified in the binding request must not be mapped to another target. For example, the SCSI ID must not already appear in the 'Current Mappings' table under 'SCSI ID'. If the SCSI ID is already in use, then the binding cannot be made dynamic, and a reboot is required.
- The target (WWPN, WWNN or DID) specified in the binding request must not be mapped to a SCSI ID. If the desired target is already mapped, then a reboot is required.
- The bind type (WWPN, WWNN or DID) specified in the binding request must match the currently active bind type shown in the Current Settings area of the Target Mapping tab. If they do not match, then the binding cannot be made active.

Changing Automapping Settings

To change automapping settings:

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, select the adapter port you want to set up with persistent binding.
3. Select the **Target Mapping** tab. All targets are displayed.



Current Settings

Active Bind Type: WWPN

Automapping: Enabled

Current Mappings

WWPN	WWNN	DID	SCSI ID	Type
20:28:00:A0:B8:2F:75:27	20:0A:00:A0:B8:2F:75:27	10800	(0,1)	Auto
50:06:01:60:3A:60:0E:FB	50:06:01:60:BA:60:0E:FB	10000	(0,0)	Auto

Persistent Binding Configuration

Target WWPN	SCSI ID
20:28:00:A0:B8:2F:75:27	
50:06:01:60:3A:60:0E:FB	

Display Mode

● Show WWPN

○ Show WWNN

○ Show D_ID

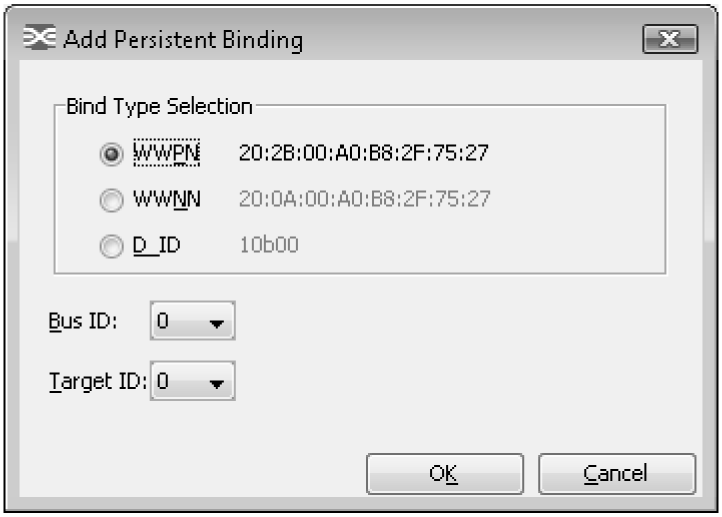
Figure 50: Target Mapping tab

4. Target mappings are displayed by WWPN, WWNN, or D_ID. “PB”, indicates mapping from persistent binding, while “Auto”, indicates an automapped target. In the Display Mode section, choose the display mode you want to use.
5. If you want click **Change Settings.**The Mapped Target Settings dialog box appears. You can enable or disable auto-mapping and change the active bind type. Click **OK**.
6. Reboot the system for changes to take effect.

Adding a Persistent Binding

To add a persistent binding:

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, select the adapter port you want to set up with persistent binding.
3. Select the **Target Mapping** tab. All targets are displayed. In the Targets Table, click the target that you want to bind.
4. Click **Add Binding**. The Add Persistent Binding dialog box is displayed.



Bind Type Selection

● WWPN 20:2B:00:A0:B8:2F:75:27

○ WWNN 20:0A:00:A0:B8:2F:75:27

○ D_ID 10b00

Bus ID: 0

Target ID: 0

Figure 51: Add Persistent Binding dialog box

5. Select the bind type that you want to use (WWPN, WWNN or D_ID).
6. Select the Bus ID and target ID that you want to bind, and click **OK**.

Note: Automapped targets have entries only in the second column of the Targets Table. Persistently bound targets have entries in the second and third columns. In this case, the third column contains the SCSI Bus and target numbers you specified in the Add Persistent Binding dialog box. This binding takes effect only after the local machine is rebooted.

Binding a Target that Does Not Appear in the Persistent Binding Table

To bind a target that does not appear in the Persistent Binding table on the Target Mapping tab:

Note: It is possible to specify a SCSI Bus and target that have already been used on behalf of a different FC target. Attempting to bind a target already in the Persistent Binding table on the Target Mapping tab results in an error message, “Target already in target list. Use the Add Binding button.”

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, select the adapter port you want to set up with persistent binding.
3. Select the **Target Mapping** tab. All targets are displayed.
4. Click **Bind New**. The Bind New Target dialog box is displayed.

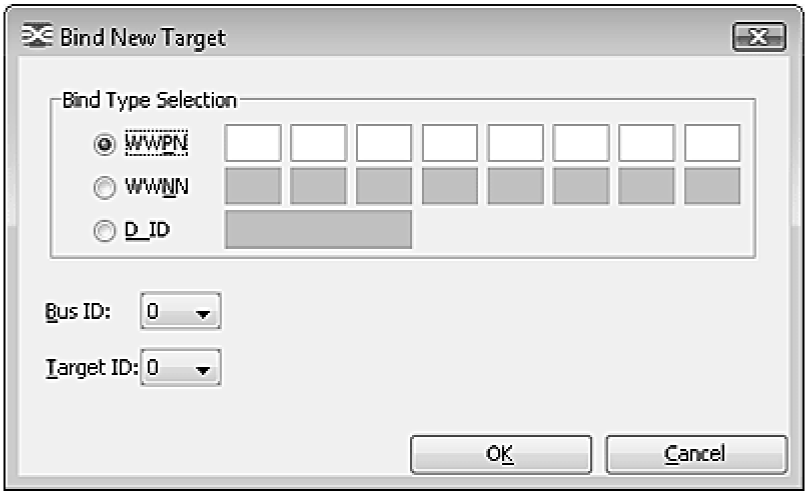


Figure 52: Bind New Target dialog box

5. Click the type of binding you want to use, and type the WWPN, WWNN or D_ID you want to bind to the target.
6. Select the Bus ID and Target ID that you want to bind, and click **OK**.

Note: A target does not appear on the target list if automapping is disabled and the target is not already persistently bound.

Adding New Targets Using sd.conf (Solaris 8, 9 and 10)

You can perform on-the-fly configuration changes, without rebooting, using the HBAnyware utility. For Solaris 8, you must first add the new targets to the sd.conf file using a text editor.

To add new targets using sd.conf (Solaris 8):

1. Edit the Solaris SCSI configuration file (sd.conf):

```
#vi /kernel/drv/sd.conf
                .
                .
                .
name="sd" parent="lpfc" target=17 lun=1;
name="sd" parent="lpfc" target=18 lun=10;
name="sd" parent="lpfc" target=19 lun=15;
                .
                .
                .
```

2. Save the file and exit the text editor.

Configuring Boot from SAN

You can use the HBAnyware utility to configure a system to boot from an attached SAN LUN. Boot from SAN allows servers on a storage network to boot their operating systems directly from a SAN storage device, typically identified by its WWPN and a LUN located on the device. By extending the server system BIOS, boot from SAN functionality is provided by the BootBIOS contained on an Emulex adapter in the server. When properly configured, the adapter then permanently directs the server to boot from a LUN on the SAN as if it were a local disk. (COMSTAR ports do not support Boot from SAN.)

Boot Types

Using the Maintenance tab, you can enable, disable or configure boot from SAN for x86 BootBIOS, EFIBoot and OpenBoot (also know as FCode).

- x86 BootBIOS works with the existing BIOS on x64 and x86 systems.
- OpenBoot (FCode) works with the existing system BIOS on Solaris SPARC systems using the SFS driver and on Linux PowerPC systems. OpenBoot is also called FCode.
- EFIBoot works with Intel Itanium 64-bit and x64-based systems and provides 64-bit system boot capability through the use of the EFI (Extensible Firmware Interface) Shell.

Emulex provides Universal Boot and Pair Boot code images that contain multiple types of boot code. These images provide multi-platform support for boot from SAN. Universal Boot and Pair Boot transparently determine your system platform type and automatically execute the proper boot code image in the adapter. These code images reside in adapter flash memory, allowing easier adapter portability and configuration between servers.

The configuration regions on the adapter store the configuration data for each of these boot types.

Note: x86 and OpenBoot share the same configuration memory space. You cannot configure an adapter for both x86 and OpenBoot *at the same time*. If you try, a message appears that the existing boot type configuration will be overwritten by the new configuration.

Note: Boot from SAN configuration does not affect current system operation. The changes only take effect upon reboot if you have configured it correctly.

Boot Device Parameters

The boot LUN for all three boot types is in the range of 0-255. EFIBoot and OpenBoot (FCode) also support an 8-byte LUN, which you can use instead of the single-byte LUN. You must select which LUN type to configure.

- For OpenBoot, you must also provide a Target ID parameter.
- The HBAnyware utility runs on a running OS, so you must boot the host to configure boot from SAN with the HBAnyware utility.
- You must work from a running host that supports the HBAnyware utility. Often, this host has booted from a direct-attached drive. With the HBAnyware utility, you can configure a direct boot host to boot from a SAN. You can modify an existing boot from SAN configuration or configure boot from SAN on an adapter for installation in another host so it can boot from SAN.
- You must know what boot-code type the adapter has; the HBAnyware utility cannot detect this. Without knowing this, you could configure a boot type but not be able to boot from it since the adapter lacks the correct boot code.
- You must know what boot type the system supports; the HBAnyware utility cannot detect this. You can configure any boot type, but if the system does not support that type, it cannot boot from SAN.
- If you manage adapters on a remote host that is running a version of the HBAnyware utility that does not support boot from SAN, the Configure Boot button does not appear.

  Note: You can configure boot from SAN before boot by using the Emulex Boot BIOS setup command line interface that runs during system startup. See the Emulex Boot BIOS setup program documentation for details.

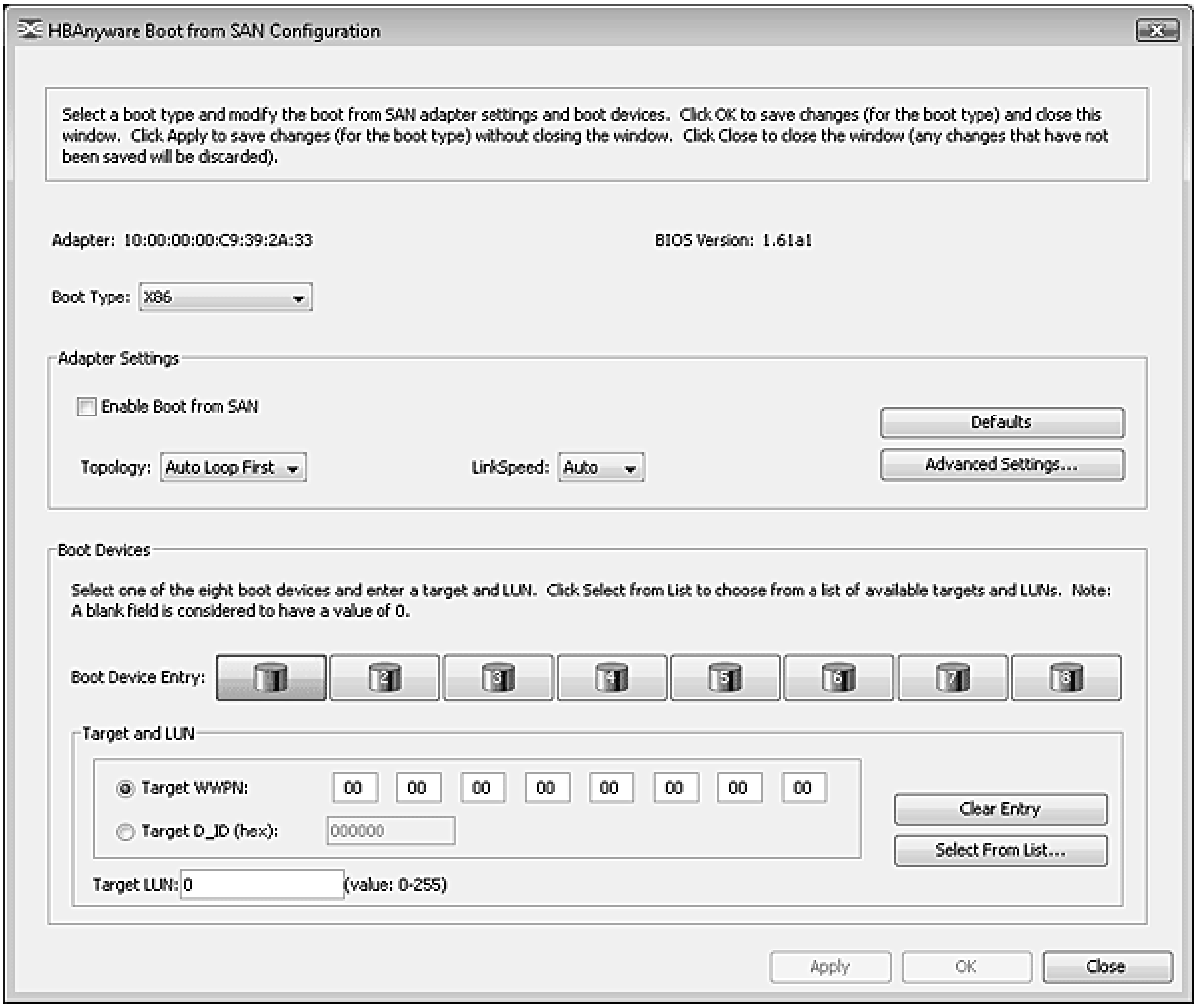
- One of the following drivers must be installed:

- Storport Miniport for Windows
- Emulex driver for Linux
- Solaris emlxs (SFS) FCA Driver
- VMware ESX 3.5 and 4.0

To configure boot from SAN:

1. Select **Host View** or **Fabric View**.
2. In the discovery-tree, click the adapter port on which you want to enable boot from SAN.
3. Select the **Maintenance** tab, check **enable adapter boot** and click **Configure Boot**. The Boot from SAN Configuration dialog box appears.

Note: The Configure Boot button is disabled if the Enable Adapter Boot checkbox is not checked. If boot code is not present on the adapter, the Enable Adapter Boot checkbox and Configure Boot button are not displayed on the Maintenance tab.



HBAnyware Boot from SAN Configuration

Select a boot type and modify the boot from SAN adapter settings and boot devices. Click OK to save changes (for the boot type) and close this window. Click Apply to save changes (for the boot type) without closing the window. Click Close to close the window (any changes that have not been saved will be discarded).

Adapter: 10:00:00:00:C9:39:2A:33

BIOS Version: 1.61a1

Boot Type: X86

Adapter Settings

□ Enable Boot from SAN

Topology: Auto Loop First

LinkSpeed: Auto

Boot Devices

Select one of the eight boot devices and enter a target and LUN. Click Select from List to choose from a list of available targets and LUNs. Note: A blank field is considered to have a value of 0.

Boot Device Entry: 1 2 3 4 5 6 7 8

Target and LUN

● Target WWPN: 00 00 00 00 00 00 00 00

○ Target D_ID (hex): 000000

Target LUN: 0 (value: 0-255)

Figure 53: Boot from SAN Configuration dialog box

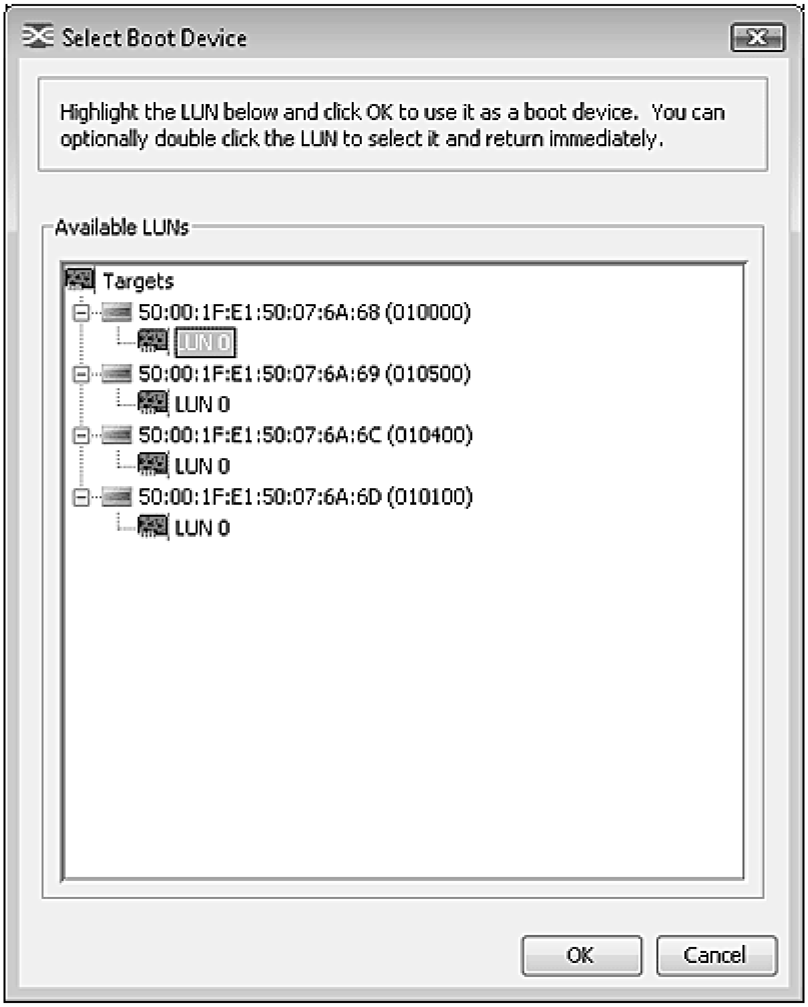
The Boot from SAN Configuration dialog box varies for each boot type. Figure 53 depicts the boot from SAN configuration for the x86 type boot.

4. Verify adapter address and boot version to make sure you configure the correct adapter and that it has the boot code version you want.
5. From the **Boot Type** menu, select x86, EFIBoot or OpenBoot.

> **Note:** x86 and OpenBoot share the same configuration memory space. You cannot configure an adapter for both x86 and OpenBoot at the same time. When you select one of these boot types and the configuration region is configured for the other boot type, a message appears warning that making changes will overwrite the other boot-type configuration.

> **Note:** If you have modified the settings for the current boot type and then change to a new boot type, a message appears telling you to save the current settings before changing to the new boot type.

6. Check **Enable Boot from SAN** and set the Topology and Link Speed.
   - Topology options are:
     - Auto, Loop First (default)
     - Auto, Point to Point First
     - Loop
     - Point to Point
   - Link speed options are:
     - Auto (default)
     - 1 Gb/s (if available)
     - 2 Gb/s (if available)
     - 4 Gb/s (if available)
     - 8 Gb/s (if available)
7. If you want, click Advanced Settings to configure autoscan, spinup delay and so on. See “Configuring Advanced Settings (Boot from SAN)” on page 93 for more information.
8. For x86 and EFIBoot, select one or more boot devices. For OpenBoot, select only one boot device.
9. Do one of the following on the Boot from SAN Configuration window.
     - Select **Target WorldWide Port Names**, type the numbers and click **OK**.
     - Select **Target D_ID**, type the numbers and click **OK**.
     - Select **Target LUN**, type the number and click **OK**.
         - For EFIBoot and OpenBoot, type in an 8-byte LUN (hex) and a target ID for the LUN. Also, you must enter the LUN value in “big endian” (most-significant byte, or “big end” first) order and enter all 16 characters including leading zeroes.
     - Click **Select from List**, select the target from a list of discovered LUNs (if available) and click **OK** on the Select Boot Device window. While you can manually enter the target and LUN from the Boot from SAN Configuration dialog box, it is easier to select an existing LUN from this window. (See Figure 54.) The HBAnyware utility attempts to update the boot parameters. If successful, a window appears with a confirmation message. Click **OK** on this confirmation window.



Highlight the LUN below and click OK to use it as a boot device. You can optionally double click the LUN to select it and return immediately.

```
Targets
  50:00:1F:E1:50:07:6A:68 (010000)
    LUN 0
  50:00:1F:E1:50:07:6A:69 (010500)
    LUN 0
  50:00:1F:E1:50:07:6A:6C (010400)
    LUN 0
  50:00:1F:E1:50:07:6A:6D (010100)
    LUN 0
```

Figure 54: Select Boot Device window (for x86 or EFIBoot)

10. On the Boot from SAN Configuration dialog box, click **Apply** to save your changes, but leave the dialog box open or click **OK** to apply the changes and close the dialog box.

> **Note:** Click **Close** to close the Boot from SAN Configuration dialog box without saving your changes. A message appears to discard your changes.

11. Reboot the system for your changes to take effect.

Configuring Advanced Settings (Boot from SAN)

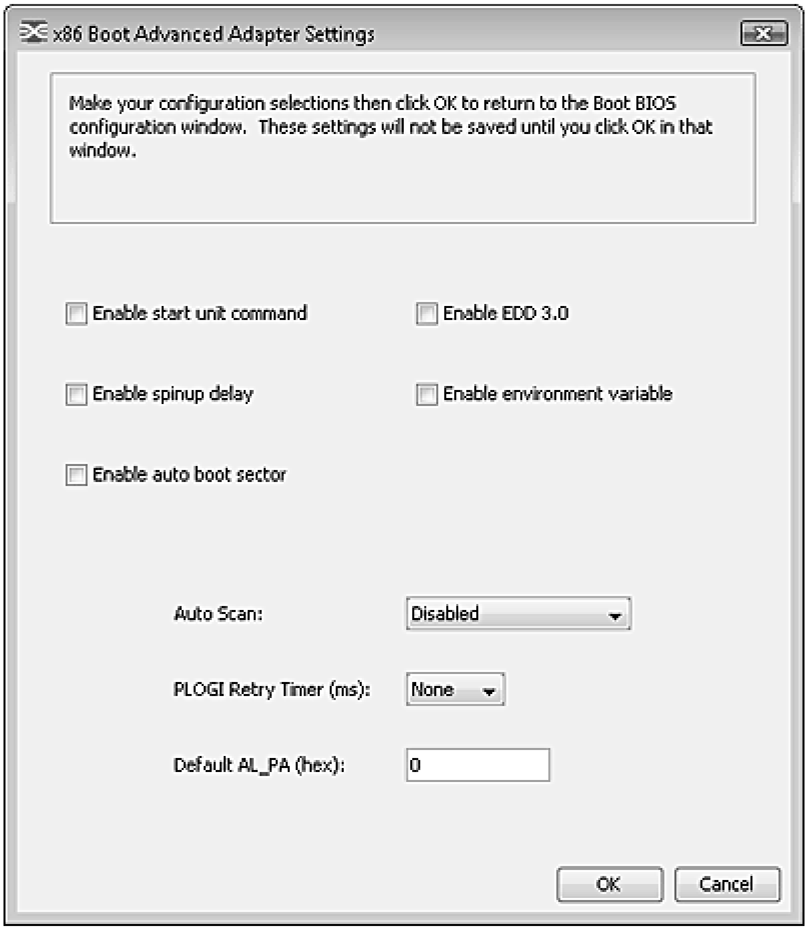
The HBAnyware utility provides advanced settings for each boot type. From the Boot from SAN Configuration dialog box, click **Advanced Settings**. A boot type-specific dialog box allows you to enable options such as spinup delay and autoscan. If you do not use advanced settings, the default values are used.

If you make changes you must click **OK** to save the changes and close the dialog box. You can click **Cancel** and close the dialog box without saving the changes.

Note: If you do not enter the advanced settings and the configuration for the boot type is new, default values are used. The default settings are given with descriptions of the Advanced Adapter Settings dialog boxes in the following sections.

x86 Boot Advanced Adapter Settings dialog box

Using this dialog box, configure advanced settings for the selected x86 adapter. All checkboxes are cleared (off) by default. All changes require a reboot to activate.



x86 Boot Advanced Adapter Settings

Make your configuration selections then click OK to return to the Boot BIOS configuration window. These settings will not be saved until you click OK in that window.

□ Enable start unit command
□ Enable EDD 3.0
□ Enable spinup delay
□ Enable environment variable
□ Enable auto boot sector

Auto Scan: Disabled

PLOGI Retry Timer (ms): None

Default AL_PA (hex): 0

Figure 55: x86 Boot Advanced Adapter Settings dialog box

x86 Boot Advanced Adapter Settings Field Definitions

- Enable Start unit command - Issues the SCSI start unit command. You must know the specific LUN to issue.
- Enable EDD 3.0 - Enables the Enhanced Disk Drive (EDD) option (shows the path to the boot device). Available on Intel Itanium servers only.

Note: An x86 series system could hang during Windows 2000 Server installation if EDD 3.0 is enabled.

- Enable spinup delay - If at least one boot device has been defined, and the spinup delay is enabled, the BIOS searches for the first available boot device.
  - If a boot device is present, the BIOS boots from it immediately.

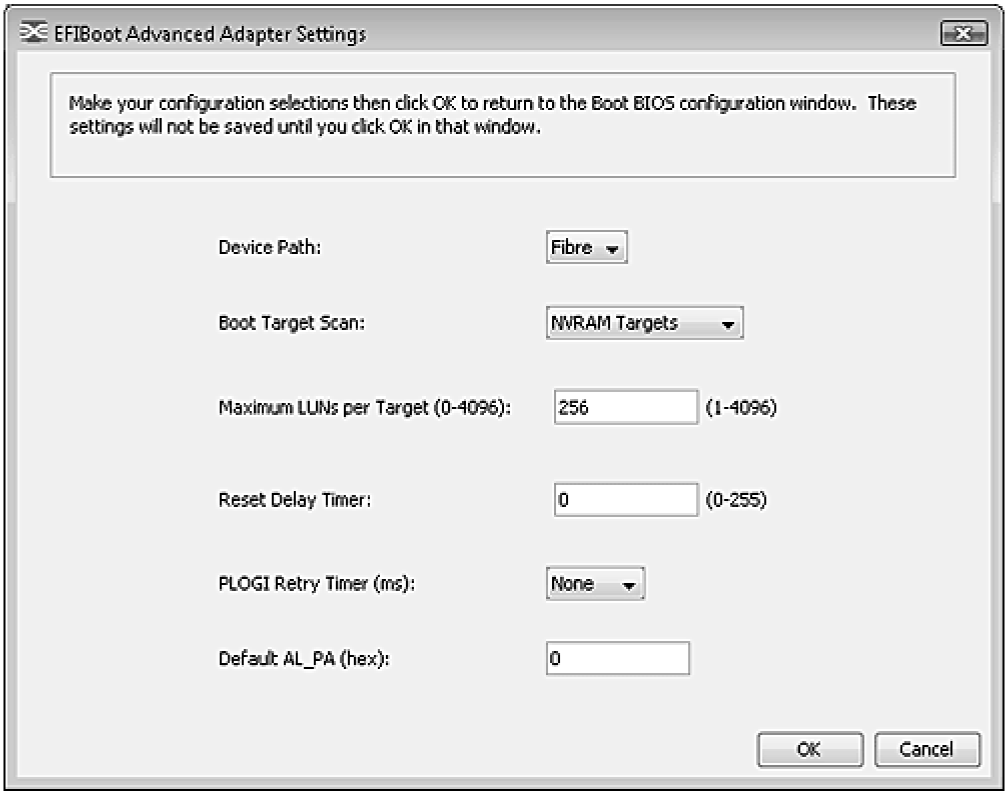
- If a boot device is not ready, the BIOS waits for the spinup delay and, for up to three additional minutes, continues the boot scanning algorithm to find another multi-boot device.

Note: The default topology is auto topology with loop first. Change this topology setting, if necessary, before configuring boot devices.

  - If no boot devices have been defined and auto scan is enabled, then the BIOS waits for five minutes before scanning for devices.
  - In a private loop, the BIOS attempts to boot from the lowest target AL_PA it finds.
  - In an attached fabric, the BIOS attempts to boot from the first target found in the NameServer data.
- Enable environment variable - Sets the boot controller order if the system supports the environment variable.
- Enable auto boot sector - Automatically defines the boot sector of the target disk for the migration boot process, which applies only to HP MSA1000 arrays. If there is no partition on the target, the default boot sector format is 63 sectors.
- Set Auto Scan - With auto scan enabled, the first device issues a Name Server Inquiry. The boot device is the first DID, LUN 0, or not LUN 0 device returned, depending on the option you select. Only this device is the boot device and it is the only device exported to the Multi-boot menu. Auto Scan is available only if none of the eight boot entries is configured to boot via DID or WWPN. Emulex strongly recommends that you use the Configure Boot Devices menu to configure eight boot entries for fabric point-to-point, public loop or private loop configurations. Set to one of the following:
  - Disabled (default)
  - Any First Device
  - First LUN 0 Device
  - First non-LUN 0 Device
- Set the PLOGI Retry Timer - Sets the interval for the PLOGI (port log in) retry timer. This option is especially useful for Tachyon-based RAID arrays. Under very rare occasions, a Tachyon-based RAID array resets itself and the port goes offline temporarily in the loop. When the port comes to life, the PLOGI retry interval scans the loop to discover this device. This default setting is None (0 msec). Set to one of the following:
  - None (default)
  - 50 ms
  - 100 ms
  - 200 ms
- Type the Default AL_PA number - It has a range of 00-EF (default=0). Changes the AL_PA (Arbitrated Loop Physical Address) of the selected adapter.

EFIBoot Advanced Adapter Settings dialog box

Use the EFIBoot Advanced Adapter Settings dialog box to configure the advanced settings for the selected EFIBoot adapter.



EFIBoot Advanced Adapter Settings

Make your configuration selections then click OK to return to the Boot BIOS configuration window. These settings will not be saved until you click OK in that window.

Device Path: Fibre

Boot Target Scan: NVRAM Targets

Maximum LUNs per Target (0-4096): 256 (1-4096)

Reset Delay Timer: 0 (0-255)

PLOGI Retry Timer (ms): None

Default AL_PA (hex): 0

Figure 56: EFIBoot Advanced Adapter Settings dialog box

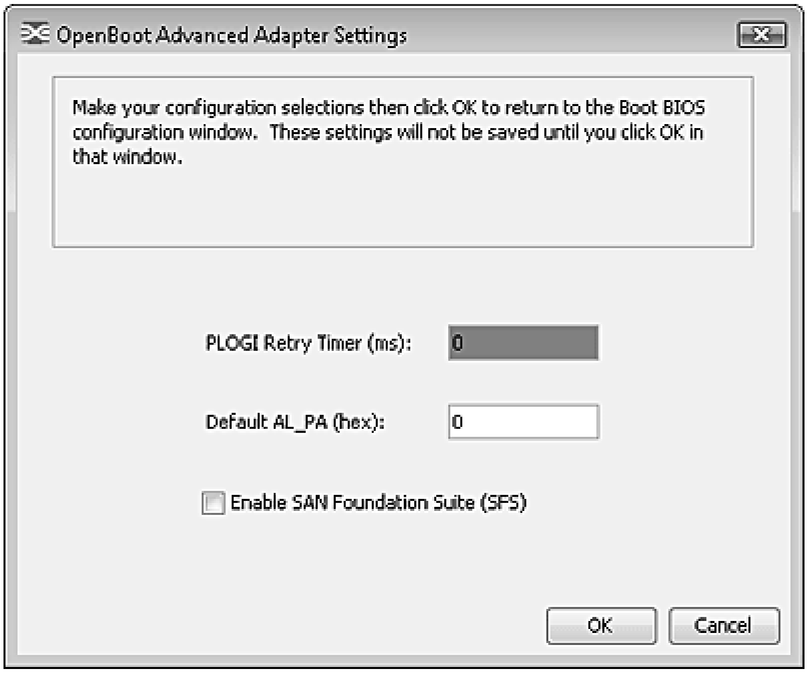
EFIBoot Advanced Adapter Settings Field Definitions

- Device Path - Makes the Fibre driver appear as a SCSI driver.
  - Fibre (default)
  - SCSI
- Boot Target Scan -This option is available only if none of the eight boot entries are configured to boot via DID or WWPN.
- Boot Path: NVRAM Targets (default) - Discovers only LUNs that are saved to the adapter Non-Volatile Random Access Memory (NVRAM).
  - Boot Path - Discovered Targets - Discovers all devices that are attached to the FC port. Discovery can take a long time on large SANs.
  - None
  - EFIBootFCScanLevel: NVRAM Targets and EFIBootFCScanLevel: Discovered Targets - Allows 3rd party software to toggle between Boot Path from NVRAM and Boot Path from Discovered Targets by manipulating an EFI system NVRAM variable.
- Maximum LUNs per Target - Sets the maximum number of LUNs that are polled during device discovery. The range is 1 to 4096. The default is 256.
- Reset Delay Timer in seconds - Sets a value for delay device discovery. The range is 0 to 255. The default is 0.

- PLOGI Retry Timer - Sets the interval for the PLOGI (port log in) retry timer. This option is especially useful for Tachyon-based RAID arrays. Under very rare occasions, a Tachyon-based RAID array resets itself and the port goes offline temporarily in the loop. When the port comes online again the PLOGI retry interval scans the loop to discover this device.
  - 50 ms
  - 100 ms
  - 200 ms
- Default AL_PA number - The range is 0x 00-EF. The default is 0x00. This option changes the AL_PA (Arbitrated Loop Physical Address) of the selected adapter.

OpenBoot Advanced Adapter Settings dialog box

Use this dialog box to configure the Advanced Adapter Settings for the selected OpenBoot adapter.



Make your configuration selections then click OK to return to the Boot BIOS configuration window. These settings will not be saved until you click OK in that window.

PLOGI Retry Timer (ms): 0

Default AL_PA (hex): 0

□ Enable SAN Foundation Suite (SFS)

Figure 57: OpenBoot Advanced Settings dialog box

OpenBoot Advanced Adapter Field Definitions

- PLOGI Retry Timer - Sets the PLOGI Retry timer value. Range is 0 to 0xFF.
- Default AL_PA (hex) - Sets the default AL_PA. The range is 0 to 0xEF. The default is 0.
- Enable the Software Foundation Suite (SFS) - Check to enable the Software Foundation Suite (SFS) driver (the emlxs driver). The default is the LPFC driver.

Exporting SAN Information

The HBAnyware utility enables you to create reports about discovered SAN elements. Reports are generated in .xml and .csv format and include all the SAN information that is displayed through the various HBAnyware tabs.

Note: Creating a SAN report can take several minutes for a large SAN.

To create a SAN report:

1. From the **File** menu, select **Export SAN** Info.
2. Browse to a folder and enter a filename with .xml or .csv extension.
3. Click **Save** to start the export process.

   During the export process, progress is displayed in the lower right hand side of the progress bar. On Windows, you cannot change views, reset, or download firmware during the export process.

Diagnostics

Note: All diagnostic tests and diagnostic dumps can only be performed on the local system or on remote systems connected with TCP/IP access. Diagnostic tests and diagnostic dumps cannot be performed on remote systems connected with FC access.

Note: Not supported on systems using CIM provider v1.2.1 on ESX 3i. and only partially supported on systems using CIM provider v2.0 on ESX 4i.

Note: Quick Test, POST Test, and the Advanced Diagnostic Test buttons are disabled for any remote adapter that is managed in-band.

Note: Diagnostics are not supported on COMSTAR ports.

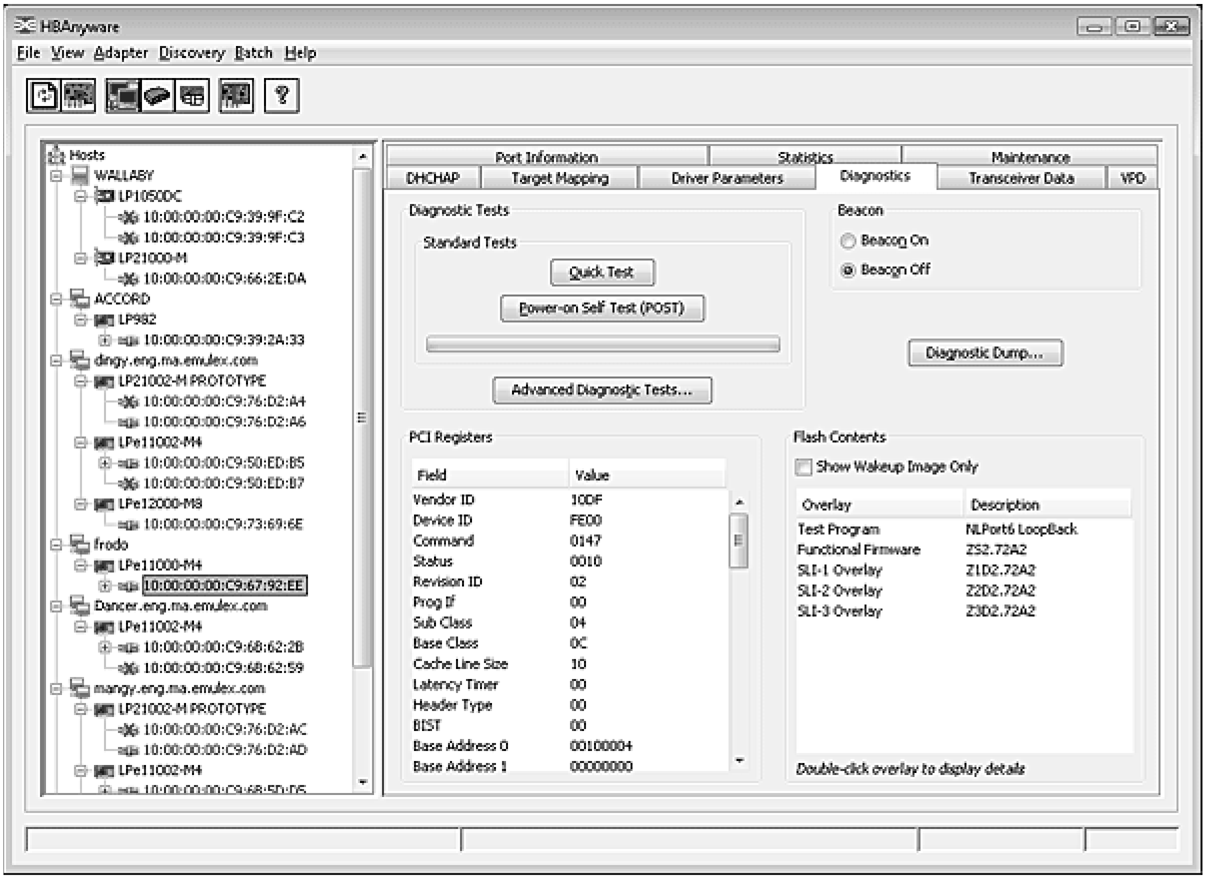
Use the Diagnostics tab to do the following:

- View flash load list, PCI registers and wakeup parameter information.
- Run these tests on Emulex adapter's installed in the system: (Not available in read-only mode.)
  - PCI Loopback (see page 103)
  - Internal Loopback (see page 103)
  - External Loopback (see page 103)
  - Power-On Self Test (POST) (see page 101)
  - Echo (End-to-End) (see page 105)
  - Quick Test (see page 100)
- Perform a diagnostic dump (see page 101) (Not available in read-only mode.)
- Control adapter beaconing (see page 101) (Not available in read-only mode.)

All functions are supported locally and remotely on hosts managed with TCP/IP access.

Viewing Flash Contents, PCI Registers and Wakeup Information

The Diagnostic tab shows PCI register dump information and flash memory contents. The information is read-only and is depicted below:



- Hosts
  - WALLABY
    - LP1050DC
      - 10:00:00:00:C9:39:9F:C2
      - 10:00:00:00:C9:39:9F:C3
    - LP21000-M
      - 10:00:00:00:C9:66:2E:DA
  - ACCORD
    - LP982
      - 10:00:00:00:C9:39:2A:33
  - dingy.eng.ma.emulex.com
    - LP21002-M PROTOTYPE
      - 10:00:00:00:C9:76:D2:A4
      - 10:00:00:00:C9:76:D2:A6
    - LPe11002-M4
      - 10:00:00:00:C9:50:ED:B5
      - 10:00:00:00:C9:50:ED:B7
    - LPe12000-M8
      - 10:00:00:00:C9:73:69:6E
  - frodo
    - LPe11000-M4
      - 10:00:00:00:C9:67:92:EE
  - Dancer.eng.ma.emulex.com
    - LPe11002-M4
      - 10:00:00:00:C9:68:62:2B
      - 10:00:00:00:C9:68:62:59
  - mangy.eng.ma.emulex.com
    - LP21002-M PROTOTYPE
      - 10:00:00:00:C9:76:D2:AC
      - 10:00:00:00:C9:76:D2:AD
    - LPe11002-M4
      - 10:00:00:00:C9:68:5D:D5

○ Beacon On
● Beacon Off

Field	Value
Vendor ID	10DF
Device ID	FE00
Command	0147
Status	0010
Revision ID	02
Prog If	00
Sub Class	04
Base Class	0C
Cache Line Size	10
Latency Timer	00
Header Type	00
BIST	00
Base Address 0	00100004
Base Address 1	00000000

☐ Show Wakeup Image Only

Overlay	Description
Test Program	NLPort6 LoopBack
Functional Firmware	ZS2.72A2
SLI-1 Overlay	Z1D2.72A2
SLI-2 Overlay	Z2D2.72A2
SLI-3 Overlay	Z3D2.72A2

Double-click overlay to display details

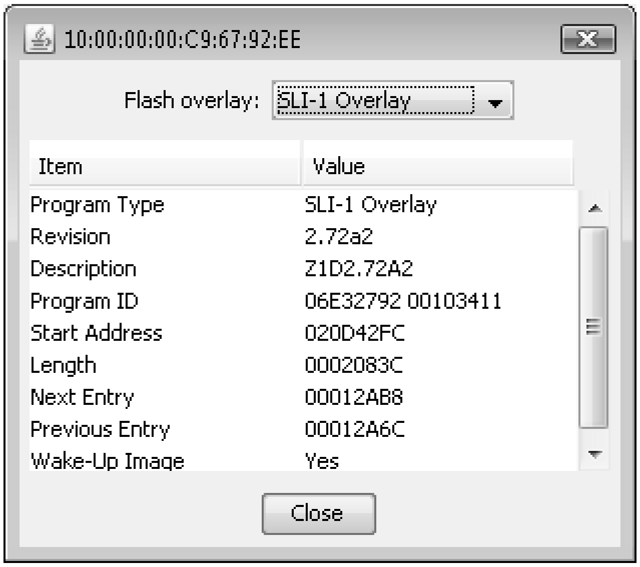
Figure 58: PCI Registers and Flash Contents of the Diagnostics tab

Viewing Flash Contents

If you check the **Show Wakeup Image Only** checkbox, the flash overlays that are not loaded when the system is booted no longer display. This checkbox defaults to unchecked.

Viewing Overlay Details

If you double-click on a flash overlay, another window appears with details about that overlay.



Flash overlay: SLI-1 Overlay

Item	Value
Program Type	SLI-1 Overlay
Revision	2.72a2
Description	Z1D2.72A2
Program ID	06E32792 00103411
Start Address	020D42FC
Length	0002083C
Next Entry	00012AB8
Previous Entry	00012A6C
Wake-Up Image	Yes

Figure 59: Overlay Detail window

To see the details of a different flash overlay image, you can either close the details window and double-click on another overlay name, or choose a different overlay name from the Flash overlay menu.

Viewing the PCI Registers

The PCI Registers appear directly on the Diagnostics tab.

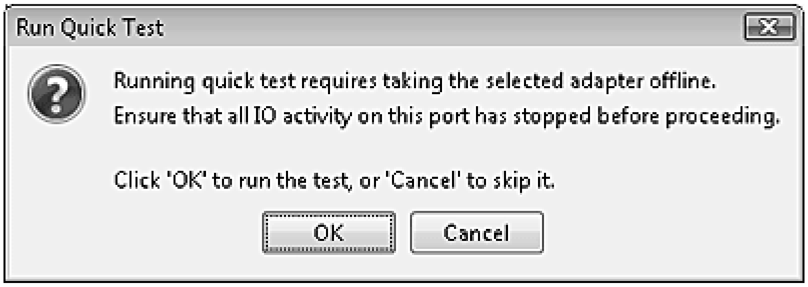
Running a Quick Test

The Diagnostics tab enables you to run a “quick” diagnostics test on a selected adapter. The Quick Test consists of 50 PCI Loopback test cycles and 50 Internal Loopback test cycles. (Not available in read-only mode.)

Note: Internal and External Loopback tests are not available for LP2100 and LP21002 adapters.

To use quick test:

1. From the discovery-tree, select the adapter port on which you want to run the Quick Test.
2. Select the **Diagnostics** tab and click **Quick Test**. A warning message appears.



Running quick test requires taking the selected adapter offline.
Ensure that all IO activity on this port has stopped before proceeding.

Click 'OK' to run the test, or 'Cancel' to skip it.

Figure 60: Quick Test Warning

3. Click **OK** to run the test. The Quick Diagnostic Test window appears displaying the PCI Loopback and Internal Loopback test results.

Running a Power On Self Test (POST)

The POST is a firmware test normally performed on an adapter after a reset or restart. The POST does not require any configuration to run. (Not available in read-only mode.)

To run the POST:

1. From the discovery-tree, select the adapter port on which you want to run the POST.
2. Select the **Diagnostics** tab and click **Power-on Self Test (POST)**. A warning dialog box appears.
3. Click **OK**. A POST window appears displaying POST information.

Using Beaconing

The beaconing feature enables you to force a specific adapter's LEDs to blink in a particular sequence. The blinking pattern acts as a beacon, making it easier to locate a specific adapter among racks of other adapters. (Not available in read-only mode.)

When you enable beaconing, the two LEDs blink rapidly in unison for 24 seconds, after which the LEDs report the adapter health status for 8 seconds. When the 8 seconds are up, the adapter returns to beaconing mode. This cycle repeats indefinitely until you disable this feature or you reset the adapter.

Note: The beaconing buttons are disabled if the selected adapter does not support beaconing.

To enable or disable beaconing:

1. From the discovery-tree, select the adapter port whose LEDs you want to set.
2. Select the **Diagnostics** tab and click **Beacon On** or **Beacon Off**.

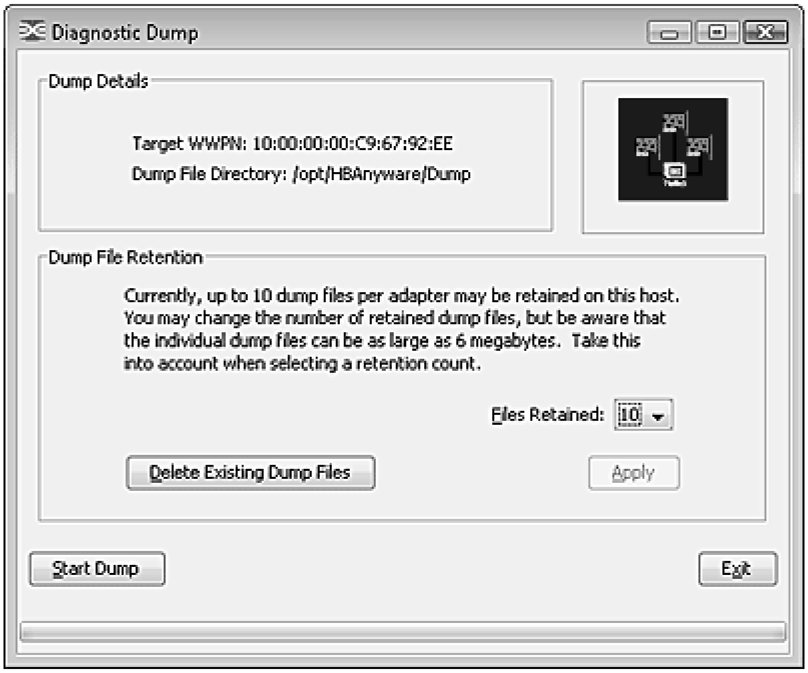
Creating Diagnostic Dumps

The diagnostic dump feature enables you to create a "dump" file for a selected adapter. Dump files contain various information such as firmware version, driver version and so on, that is particularly useful when troubleshooting an adapter. (Not available in read-only mode.)

Caution: Disruption of service can occur if a diagnostic dump is run during I/O activity.

To start a diagnostic dump:

1. From the discovery-tree, select an adapter port whose diagnostic information you want to dump.
2. Select the **Diagnostics** tab and click **Diagnostic Dump**. The Diagnostic Dump dialog box appears. You can specify how many files you want to save using the Files Retained counter. Click **Delete Existing Dump Files** if you want to remove existing dump files from your system.



Target WWPN: 10:00:00:00:C9:67:92:EE

Dump File Directory: /opt/HBAnyware/Dump

Currently, up to 10 dump files per adapter may be retained on this host. You may change the number of retained dump files, but be aware that the individual dump files can be as large as 6 megabytes. Take this into account when selecting a retention count.

Files Retained: 10

Figure 61: Diagnostic Dump dialog box

3. Click **Start Dump**. A warning message appears about taking the adapter offline.
4. Click **OK**. Dump files are created. Where these files are created depends upon your operating system:
   - Windows - %ProgramFiles%\Util\Dump\
   - Solaris - /opt/HBAnyware/Dump
   - Linux and VMware Server - /usr/sbin/hbanyware/Dump

   Two files are created:
   - *<Hostname_WWPN_Date-Time>*.dmp
   - *<Hostname_WWPN_Date-Time>*.txt

Running Advanced Diagnostic Tests

The Advanced Diagnostics feature gives you greater control than the Quick Test over the type of diagnostics tests that run. Through Advanced Diagnostics, you can specify which tests to run, the number of cycles to run and what to do in the event of a test failure. (Not available in read-only mode.)

Note: Internal and External Loopback tests are not available for LP21000 and LP21002 adapters.

To run advanced diagnostics tests:

Click **Advanced Diagnostic Tests** on the Diagnostics tab to view the Diagnostic Test Setup dialog box.

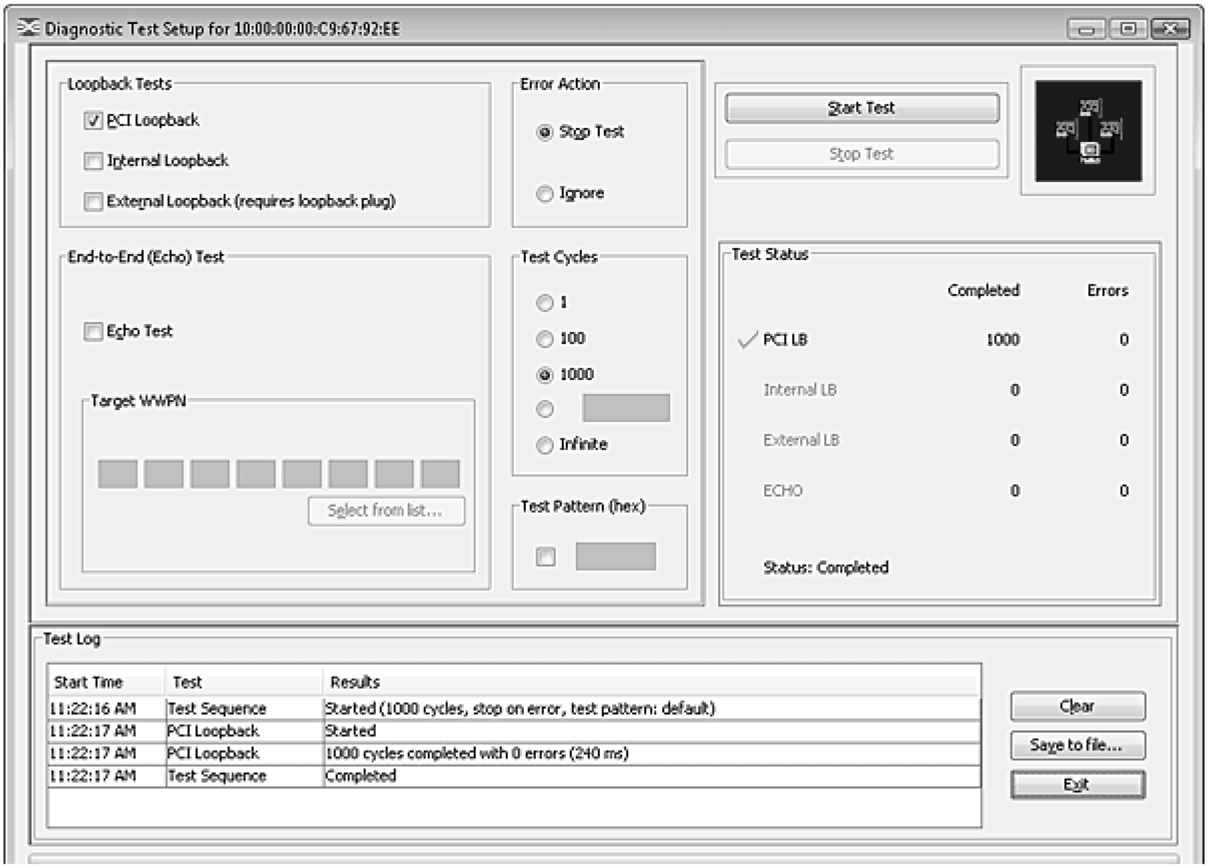
You can run four types of tests:

- PCI Loopback
- Internal Loopback
- External Loopback

- End-to-End (ECHO)

Note: You cannot run the External Loopback test and ECHO test concurrently. If you select External Loopback the ECHO test section is disabled and vice versa.

Test results and the status of running tests are time stamped and appear in the Test Log area.



Diagnostic Test Setup for 10:00:00:00:C9:67:92:EE

Loopback Tests

☑ PCI Loopback
☐ Internal Loopback
☐ External Loopback (requires loopback plug)

Error Action

● Stop Test
○ Ignore

End-to-End (Echo) Test

☐ Echo Test

Target WWPN

Test Cycles

○ 1
○ 100
● 1000
○
○ Infinite

Test Pattern (hex)

☐

Test Status

	Completed	Errors
✓ PCI LB	1000	0
Internal LB	0	0
External LB	0	0
ECHO	0	0

Status: Completed

Test Log

Start Time	Test	Results
11:22:16 AM	Test Sequence	Started (1000 cycles, stop on error, test pattern: default)
11:22:17 AM	PCI Loopback	Started
11:22:17 AM	PCI Loopback	1000 cycles completed with 0 errors (240 ms)
11:22:17 AM	Test Sequence	Completed

Figure 62: Diagnostic Test Setup

Running Loopback Tests

To run a loopback test, use the Loopback Test section of the Advanced Diagnostics dialog box.

Loopback Test Combinations

Run the following loopback test combinations using the appropriate checkboxes:

- PCI Loopback Test - A firmware controlled diagnostic test in which a random data pattern is routed through the PCI Bus without being sent to an adapter link port. The returned data is subsequently validated for integrity.
- Internal Loopback Test - A diagnostic test in which a random data pattern is sent down to an adapter link port, then is immediately returned without actually going out on the port. The returned data is subsequently validated for integrity.

- External Loopback Test - A diagnostic test in which a random data pattern is sent down to an adapter link port. The data goes out the port and immediately returns via a loopback connector. The returned data is subsequently validated for integrity.

> **Note:** You cannot run the External Loopback test and ECHO test concurrently. If you select External Loopback the ECHO test section is disabled and vice versa.

Error Action

Enables you to define what is to be done in the event of a test failure. There are two error action options:

- Stop Test - The error is logged and the test aborted. No further tests are run.
- Ignore - Log the error and proceed with the next test cycle.

Test Cycles

Enables you to specify test cycles three ways:

- Select an established cycle count by clicking on the corresponding radio button.
- Enter a custom cycle count in the blank field in the Test Cycles area.
- Set the test to run until you manually click Stop Test, by selecting the Infinite radio button.

Test Pattern

Enter a custom test pattern to be used in tests that transfer data. The test pattern can be up to 8 hexadecimal bytes.

Test Status

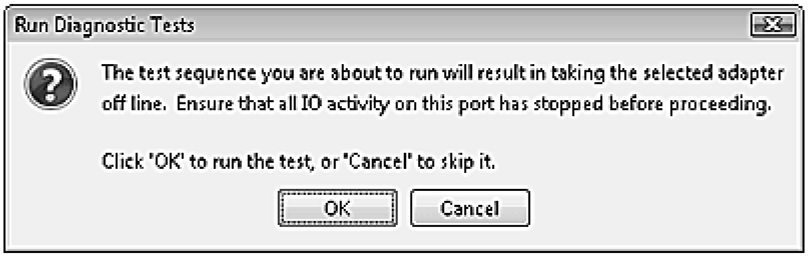
The Test Status area displays how many completed cycles of each test ran, as well as the number of errors.

To run loopback tests:

1. From the discovery-tree, select the adapter port on which you want to run the Loopback Test.
2. Select the **Diagnostics** tab and click **Advanced Diagnostics Tests**. From the Loopback Test section of the dialog box, choose the type of Loopback test you want to run and define the loopback test parameters.

> **Note:** You must insert a loopback plug in the selected adapter before running an External Loopback test.

3. Click **Start**. The following warning appears:



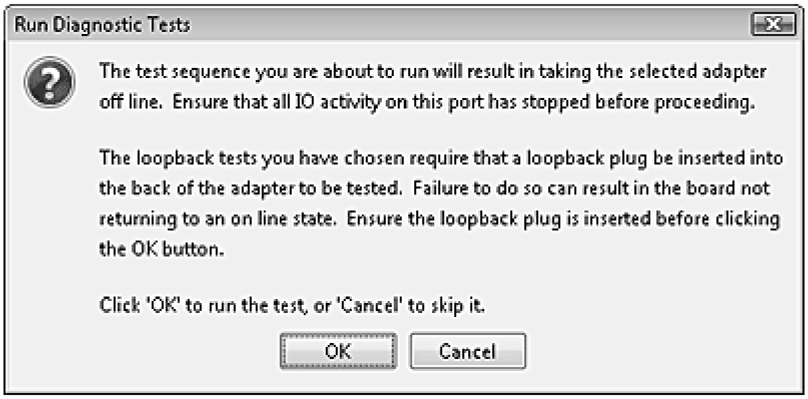
Run Diagnostic Tests

The test sequence you are about to run will result in taking the selected adapter off line. Ensure that all IO activity on this port has stopped before proceeding.

Click 'OK' to run the test, or 'Cancel' to skip it.

Figure 63: Run Diagnostic Tests Warning

4. Click **OK**. If you choose to run an External Loopback test the following window appears:



The test sequence you are about to run will result in taking the selected adapter off line. Ensure that all IO activity on this port has stopped before proceeding.

The loopback tests you have chosen require that a loopback plug be inserted into the back of the adapter to be tested. Failure to do so can result in the board not returning to an on line state. Ensure the loopback plug is inserted before clicking the OK button.

Click 'OK' to run the test, or 'Cancel' to skip it.

Figure 64: Advanced Diagnostic Tests Warning window for External Loopback

5. Click **OK**. The progress bar indicates that the test is running.

   Periodic test feedback, consisting of the current loopback test/cycle plus the completion status of each type of test, is displayed in the Test Log section of the dialog box. Click **Clear** to erase the contents of the log display or click **Save to File** to save the log file.

Running End-to-End (ECHO) Tests

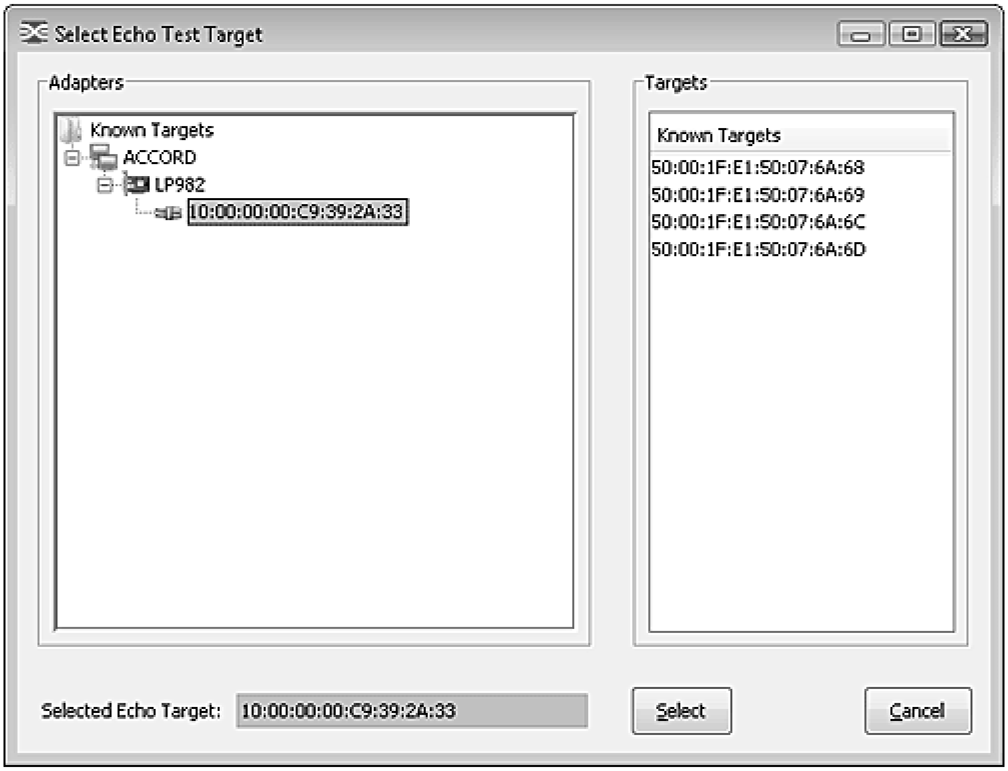
Run echo tests using the End-to-End (ECHO) Test section of the Diagnostics tab. The end-to-end test enables you send an ECHO command/response sequence between an adapter port and a target port. (Not available in read-only mode.)

Note: Not all remote devices respond to an echo command.
You cannot run the ECHO test and the External Loopback test concurrently. If you select the ECHO Test the External Loopback test is disabled.

To run end-to-end echo tests:

1. From the discovery-tree, select the adapter port from which to initiate the End-to-End (ECHO) Test.
2. Select the **Diagnostics** tab. Click **Advanced Diagnostic Tests** (see Figure 65 on page 106).
3. Check **Echo Test**. Enter the World Wide Port Name (WWPN) for the target.
   or
   Click **Select From List** if you do not know the actual WWPN of the test target. The Select Echo Test Target dialog box appears. Select the port to test from the tree-view and click **Select**.

   All relevant information for the selected port is automatically added to the Target Identifier section of the Diagnostics dialog box.



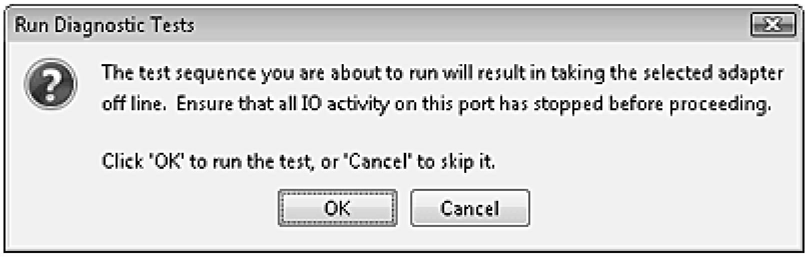
Known Targets
- ACCORD
  - LP982
    - 10:00:00:00:C9:39:2A:33

Known Targets
50:00:1F:E1:50:07:6A:68
50:00:1F:E1:50:07:6A:69
50:00:1F:E1:50:07:6A:6C
50:00:1F:E1:50:07:6A:6D

Selected Echo Target: 10:00:00:00:C9:39:2A:33

Figure 65: Select Echo Test Target window

4. Define the other parameters you want to use and click **Start Test**. The following warning window appears:



The test sequence you are about to run will result in taking the selected adapter off line. Ensure that all IO activity on this port has stopped before proceeding.

Click 'OK' to run the test, or 'Cancel' to skip it.

Figure 66: Advanced Diagnostic Tests Warning window

5. Click **OK**. A result screen appears and the test results appear in the Test Log. Click **Clear** to erase the contents of the log display or click **Save to File** to save the log file.

Saving the Log File

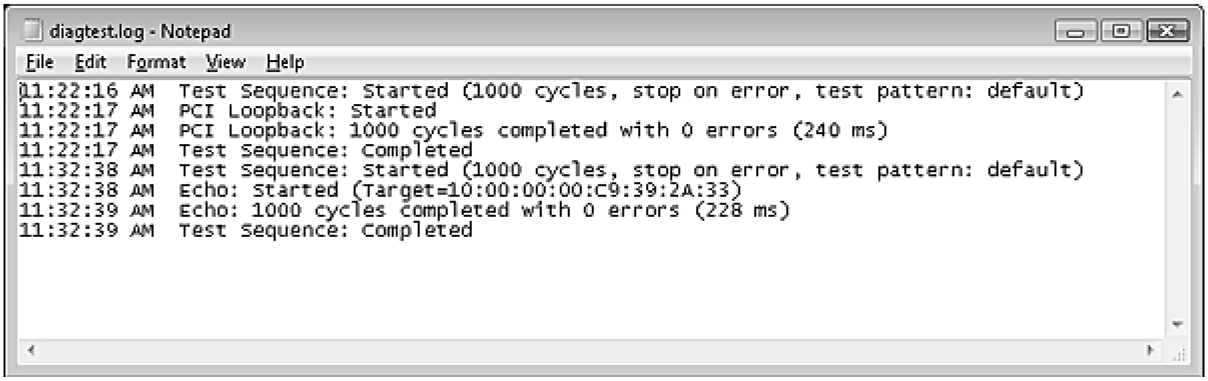
You can save the test log to a log file for later viewing or printing. When new data is written to a saved file, the data is appended to the end of the file. Each entry has a two-line header that contains the identifier of the adapter being tested and the date and time of the test. Over time, the data accumulates to form a chronological history of the diagnostics performed on the adapter. (Not available in read-only mode.)

The default location is:

- In Windows: the HBAnyware install directory on your local drive
- In Solaris SFS: /opt/HBAnyware/Dump

- In Linux and VMware Server: /usr/sbin/hbanyware/Dump

After writing an entry into the log, you are prompted to clear the display. The default name of the saved file is DiagTest.log. An example of a saved log file appears below:



```
11:22:16 AM  Test Sequence: Started (1000 cycles, stop on error, test pattern: default)
11:22:17 AM  PCI Loopback: Started
11:22:17 AM  PCI Loopback: 1000 cycles completed with 0 errors (240 ms)
11:22:17 AM  Test Sequence: Completed
11:32:38 AM  Test Sequence: Started (1000 cycles, stop on error, test pattern: default)
11:32:38 AM  Echo: Started (Target=10:00:00:00:C9:39:2A:33)
11:32:39 AM  Echo: 1000 cycles completed with 0 errors (228 ms)
11:32:39 AM  Test Sequence: Completed
```

Figure 67: Example of DiagTestLog window

To save the log file:

1. After running a test from the Diagnostic Test Setup dialog box, Click **Save to File**. The Select Diagnostic Log file Name dialog box appears. The default name of a saved file is DiagTest.log.
2. Browse to the desired directory, change the log file name if you want and click **Save**.

HBAnyware Security

Introduction

After you install the base HBAnyware software, which includes the HBAnyware utility and remote server, on a group of systems, the HBAnyware utility on any of those systems can remotely access and manage the adapters on any systems in the group depending on operating mode and read-only settings. This is not a desirable situation because any system can perform actions such as resetting boards or downloading firmware.

You can use the HBAnyware utility security package to control which HBAnyware enabled systems can remotely access and manage HBAs on other systems in an FC network. HBAnyware security is systems-based, not user-based. Anyone with access to a system that has been granted HBAnyware client access to remote HBAs can manage those HBAs. Out-of-band hosts can also be managed after they are defined. Any unsecured system is still remotely accessible by the HBAnyware client software (HBAnyware utility). The HBAnyware security software provides two main security features:

1. Prevent remote adapter management from systems that you do not want to have this capability.
2. Prevent an accidental operation (such as firmware download) on a remote adapter. In this case, you do not want to have access to adapters in systems you are not responsible for maintaining.

When you install the HBAnyware utility security software on a system and run the HBAnyware utility Security Configurator for the first time, that system becomes the Master Security Client (MSC). Only the MSC can view or manage any remote clients after they are added to the main ACG (Access Control Group). Remote clients can only see the MSC.

Remote clients can manage only by creating an Access Sub-Group (ASG). If you create an ASG, it is then the one and only client, the rest of the machines in the ASG are servers (i.e. servers can not see anybody, only client).

For more information, see “Adding a Server to an ASG” on page 117.

Any system that is already part of the security installation might not run with the proper security attributes if updates to the security configuration are made while it is offline. Any system that is part of the security installation and that is offline when the HBAnyware Security Configurator starts will not be available for security configuration changes even if it is brought online while the Configurator is running.

Note: The HBAnyware Security Configurator is not available for VMware ESX.

Starting the HBAnyware Security Configurator

Before starting the HBAnyware Security Configurator:

- Ensure that all of the systems that are part of, or will be part of, the security configuration are online on the FC network so that they receive updates or changes made to the security configuration.
- Before running the Security Configurator out-of-band, you must setup the OOB hosts or they will not be seen by the Security Configurator. See the Out-of-Band SAN Management topics for information.
- If you are running the HBAnyware Security Configurator with out-of band access, out-of band hosts must be added to the discovery-tree or they will not be seen by the Security Configurator.

To start the HBAnyware Security Configurator:

In Windows: On the desktop, click **Start>All Programs>Emulex>HBAnyware Security Configurator**. The HBAnyware Security Configurator Discovery window appears. After discovery is completed, the HBAnyware Security Configurator appears.

To start the HBAnyware Security Configurator for Linux:

- Run the /usr/sbin/hbanyware/ssc script. Type:
  `/usr/sbin/hbanyware/ssc`

To start the HBAnyware Security Configurator for Solaris:

- Run the /opt/HBAnyware/ssc script. Type:
  `/opt/HBAnyware/ssc`

Running the Configurator for the First Time/Creating the ACG

When the HBAnyware Security software is installed on a system and the HBAnyware Security Configurator is run for the first time, that system becomes the Master Security Client (MSC). All of the available servers are discovered and available to become part of the system Access Control Group (ACG). You select the systems to be added to the ACG, and the security configuration is updated on all of the selected servers as well as on the initial system. This selection constitutes the participating platforms in this security installation.

To create the ACG:

1. Start the HBAnyware Security Configurator for the first time in an unsecure environment. The computer from which you run the Configurator will become the MSC. A message is displayed:
2. Click **OK**. The Access Control Group tab is displayed.

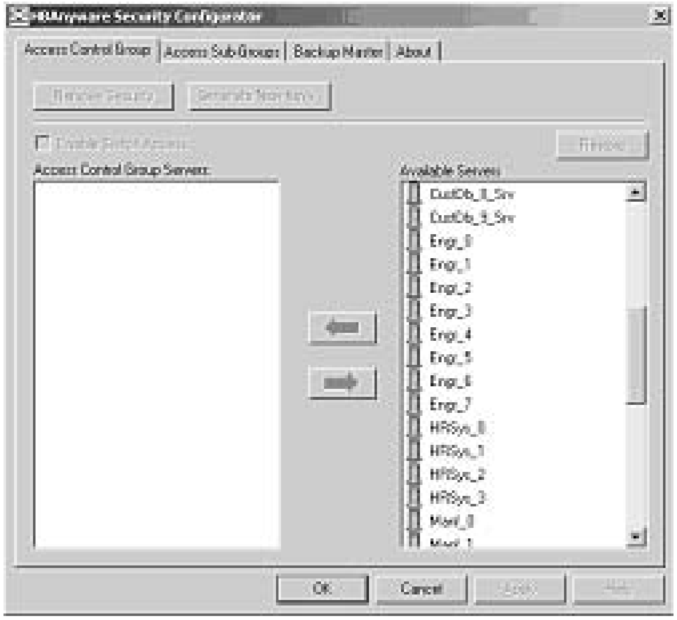
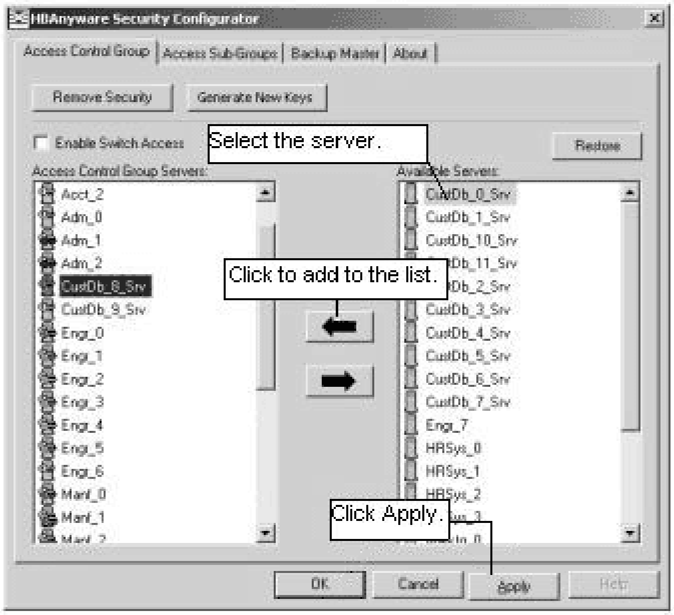


Figure 68: Access Control Group tab - No ACG Servers

3. Select the unsecured servers that you want to add to the ACG from the Available Servers list.



Select the server.

Click to add to the list.

Click Apply.

Figure 69: Access Control Group tab with ACG Servers

4. Click the **left arrow** to add the servers to the Access Control Group Servers list.
5. Click **Apply**.

Designating a Master Security Client

The first time you run the HBAnyware Security Configurator on any system in a FC network, that system becomes the MSC (Master Security Client). See “Running the Configurator for the First Time/Creating the ACG” on page 109 for more information.

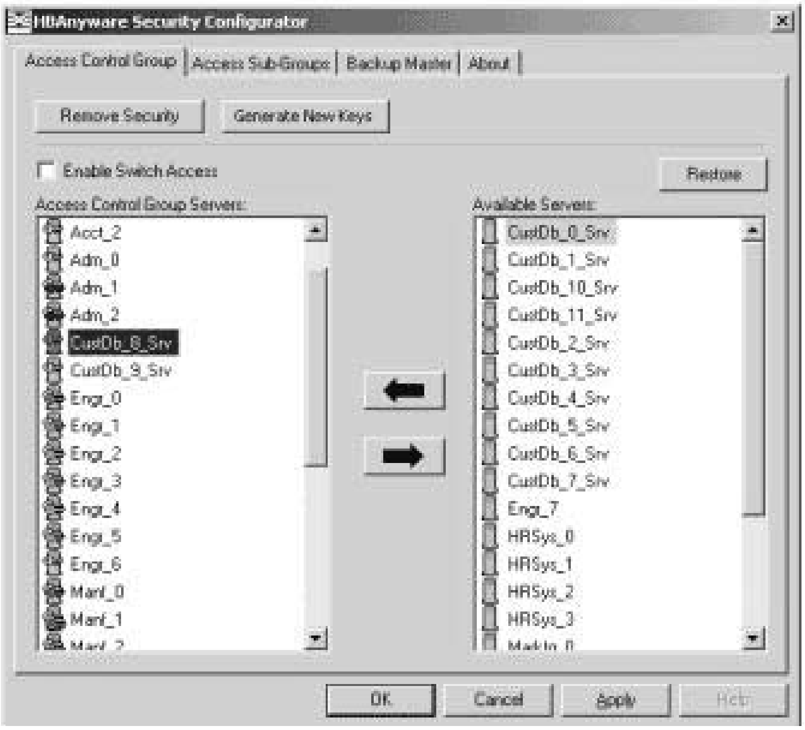
Access Control Groups

Introduction

The Access Control Group tab shows the systems that are part of a client's Access Control Group (ACG) from the Master Security Client (MSC) and allows you to select the systems that belong to the ACG.

Access Control Group Tab on the MSC

After you have configured security from the MSC for the first time, the Access Control Group tab looks similar to the following:



☐ Enable Switch Access

Access Control Group Servers:

Acct_2
Adm_0
Adm_1
Adm_2
CustDb_8_Srv
CustDb_9_Srv
Engr_0
Engr_1
Engr_2
Engr_3
Engr_4
Engr_5
Engr_6
Manf_0
Manf_1
Manf_2

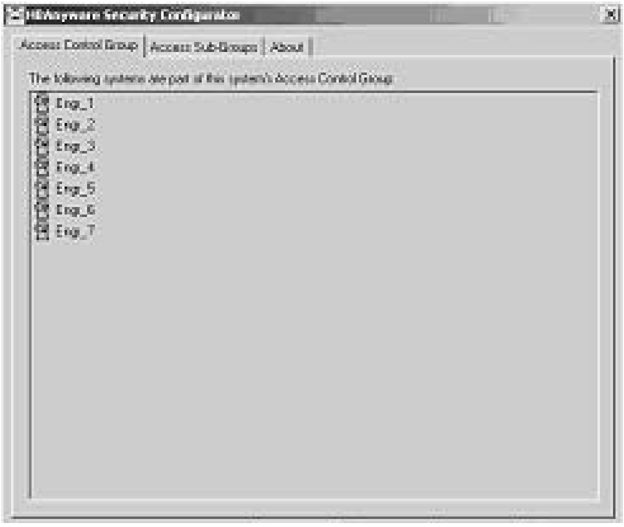
Available Servers:

CustDb_0_Srv
CustDb_1_Srv
CustDb_10_Srv
CustDb_11_Srv
CustDb_2_Srv
CustDb_3_Srv
CustDb_4_Srv
CustDb_5_Srv
CustDb_6_Srv
CustDb_7_Srv
Engr_7
HRSys_0
HRSys_1
HRSys_2
HRSys_3

Figure 70: Access Control Group tab on an MSC System

Access Control Group Tab on a Non-MSC

On a non-MSC system, the Access Control Group tab shows the systems that are part of the client's ACG. You cannot modify the ACG on a non-MSC. (You can modify the ACG only on the MSC or a client higher in the security topology's hierarchy.) The ACG tab on a non-MSC system looks similar to the following:



The following systems are part of this system's Access Control Group:

Engr_1
Engr_2
Engr_3
Engr_4
Engr_5
Engr_6
Engr_7

Figure 71: Access Control Group tab on a Non-MSC System

ACG Icons

Depending on the configured security topology, a system can be a server in one or more ACGs. It can also be a client to an ACG. The following icons indicate the state of each of the systems in the Access Control Group Servers list.

The system is a secure server in the ACG. It does not belong to an Access Sub-Group (ASG). You can remove this system from the ACG.

The system is a secure server in the ACG and belongs to one or more ASGs. You can remove this system from the ACG.

The system is a secure server in the ACG and a client to an ASG. You cannot remove this system from the ACG until you remove it as a client from the ASG.

The system is a secure server in the ACG, a secure server in one or more ASGs and a client to an ASG You cannot remove this system from the ACG until you remove it as a client from the ASGs.

The system is a Backup Master. You cannot remove this system from the ACG until you remove it as a Backup Master.

Adding a Server to the ACG

After you create the initial Access Control Group (ACG) on the Master Security Client (MSC), you can add unsecured servers to the ACG.

To add servers to the ACG:

1. On the Access Control Group tab, from the Available Servers list, select the unsecured servers to add to the ACG (Figure 70).
2. Click the **left arrow** to add the server to the Access Control Group Servers list.
3. Click **Apply**.

Deleting a Server from the ACG

To delete a server from the Access Control Group (ACG):

1. On the Access Control Group tab, from the Access Control Group Servers list, select the secured systems to delete from the ACG (Figure 70).
2. Click the **right arrow** to remove the servers from the Access Control Group Servers list.
3. Click **Apply**.

Removing Security from all Servers in the ACG

You can remove security from all systems only from the Master Security Client (MSC). Removing the entire security topology on all of the servers in the MSC's ACG puts the servers in an unsecure state. The MSC is also put in an unsecure state; consequently, it is no longer the MSC. Any participating systems that are not online will not receive the 'remove security' configuration update, and as a result will no longer be accessible remotely.

To remove security from all servers in the ACG:

1. On the Access Control Group tab, click **Remove Security**. A warning message appears.
2. Click **Yes**. Security is removed from all servers in the ACG.

Generating New Security Keys

You can generate new security keys only from a Master Security Client (MSC). After the new security keys are generated, they are automatically sent to all of the remote servers in the Access Control Group (ACG).

Note: All the servers that are part of the ACG must be online when this procedure is performed so that they can receive the new keys. Any servers that do not receive the new keys will no longer be accessible remotely.

To generate new security keys for all servers in the ACG:

1. From the MSC, start the HBAnyware Security Configurator. The Access Control Group tab appears (see Figure 68 on page 109).
2. On the Access Control Group tab, click **Generate New Keys**. A dialog box warns you that you are about to generate new security keys for all systems.
3. Click **Yes**. The new keys are generated and sent to all of the remote servers in the ACG.

Restoring the ACG to Its Last Saved Configuration

You can restore the ACG to its last saved configuration, if there are unsaved changes to the ACG, only from the Master Security Client (MSC).

To restore the ACG to its last saved configuration:

From the Access Control Group tab on the MSC, click **Restore** (Figure 70).

Accessing a Switch

You can enable switch access only on a Master Security Client (MSC). Switch access grants the client access rights to a switch to remotely access HBAs on servers in the Access Control Group (ACG).

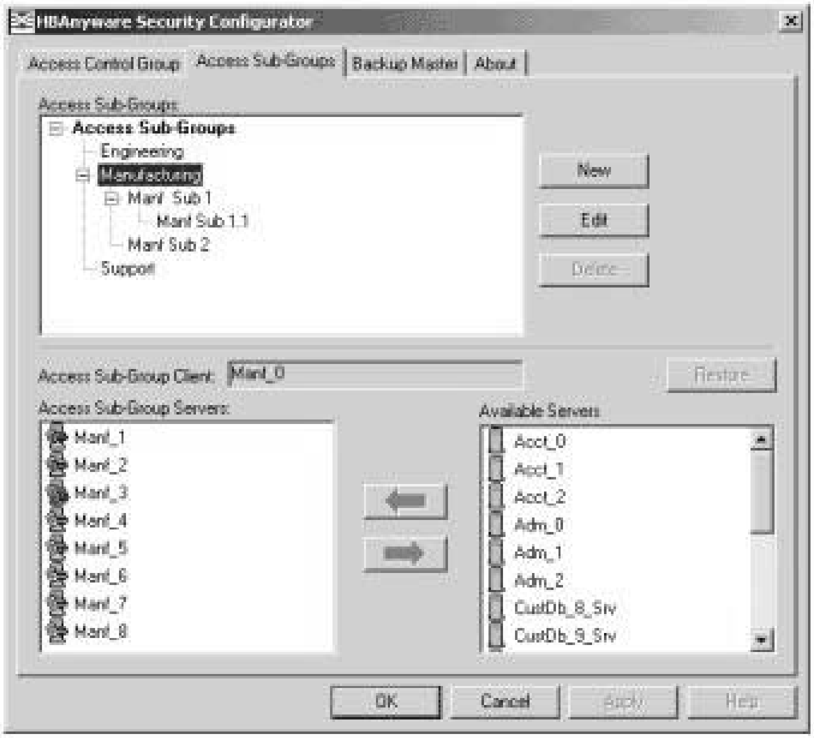
To enable switch access:

From the Access Control Group tab, check **Enable Switch Access**. (Figure 70).

Access Sub-Groups

Introduction

Use the Access Sub-Group tab to create multiple Access Sub-Groups (ASGs) and multiple levels (tiers) in the security topology hierarchy. The hierarchy can be as many levels deep as desired. However, we recommend the hierarchy extend no more than three levels deep, as it becomes increasingly difficult to keep track of the topology the deeper it goes. The hierarchy shows in the Access Sub-Groups tab as a tree. You can create, modify and delete ASGs at each level in this tree.



HBAnyware Security Configurator

Access Sub-Groups:

- Access Sub-Groups
  - Engineering
  - Manufacturing
    - Manf Sub 1
      - Manf Sub 1.1
    - Manf Sub 2
  - Support

Access Sub-Group Client: Manf_0

Access Sub-Group Servers:

Manf_1
Manf_2
Manf_3
Manf_4
Manf_5
Manf_6
Manf_7
Manf_8

Available Servers

Acct_0
Acct_1
Acct_2
Adm_0
Adm_1
Adm_2
CustDb_8_Srv
CustDb_9_Srv

Figure 72: Access Sub-Groups tab with Sub-Groups Created

ASG Icons

The following icons indicate the state of each of the servers in the Access Sub-Group Servers list.

The system is a server in the ASG but not in any child ASGs. You can remove it from the ASG.

The system is a server in the ASG and at least one child ASG. You cannot remove it from the ASG until you remove it from the child ASGs.

The system is a server in the ASG and a client to a child ASG. You cannot remove it from the ASG until you remove it as a client from the child ASG (by either deleting or editing the child ASG).

The system is a server in the ASG, a server in at least one other child ASG and a client to a child ASG. You cannot remove it from the ASG until you remove it from the child ASGs and as a client from the child ASG (by either deleting or editing the child ASG).

The system is a server in the ASG and a client to a non-child ASG. You can remove it from the ASG.

The system is a server in the ASG, a server in at least one child ASG, and a client to a non-child ASG. You cannot remove it from the ASG until you remove it from the child ASGs.

Creating an ASG

Create a new Access Sub-Group (ASG) by selecting one system from the Access Control Group (ACG) to be the client, and some or all of the other systems to be servers to this client, thus defining the new client's ACG. When the HBAnyware Security Configurator is run on the new client, the ACG shows the servers that were configured in the ASG by its parent client.

Note: After first application of security, nobody can see (remote manage) anybody except for master. Clients are then given ability to remote manage only by ASG creation. What is important but not mentioned here is that, whenever you create any ASG, there is one and only one client, the rest of the machines in the ASG are servers (i.e. servers can not “see” anybody, only client)

To create an ASG:

1. Click the **Access Sub-Groups** tab.

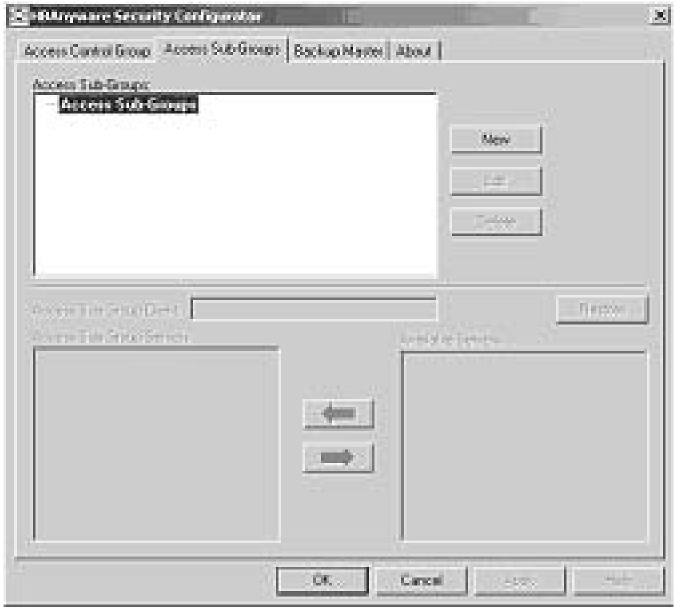
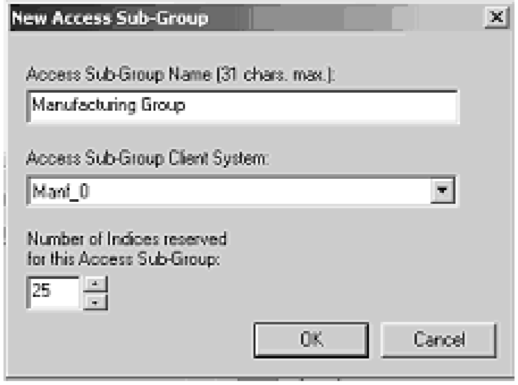


Figure 73: Access Sub-Groups tab with No Sub-Groups Created

2. Click **New**. The New Access Sub-Group dialog box appears:



Access Sub-Group Name (31 chars. max.): Manufacturing Group

Access Sub-Group Client System: Mant_0

Number of Indices reserved for this Access Sub-Group: 25

Figure 74: New Access Sub-Group dialog box

3. Enter the ASG information:
   - Access Sub-Group Name: Enter the name of the ASG. The ASG name is for identification purposes only. It does not provide any security function. Provide a name that makes it easy to remember the systems that are part of the ASG.

     The name can contain any alphanumeric characters, symbols or spaces (up to 31). At each level of the security topology, each ASG name must be unique. If the name is not unique at its level, an error message informs you of this when you click **OK**.
   - Access Sub-Group Client System: Select the system that is to be the client.
   - Number of indices reserved for this Access Sub-Group: Select the number of 'indices' you want to reserve for the client system of the new ASG. This number reflects the number of subsequent 'child' ASGs that you can subsequently create on the new client's system.
4. Click **OK** in the New Access Sub-Group dialog box. The ASG is created.

Reserved Indices - Examples

A particular security installation can support the creation of several hundred access groups (ACGs and ASGs). When you create each new access group, you allocate some number of 'indices' to the client system of the new ASG. This number reflects the number of subsequent 'child' ASGs that you can subsequently create at the new client's system.

- If zero indices are reserved, you cannot create any lower-level ASG under the client of the new ASG. Thus, if you want to implement a multi-tiered security architecture consisting of many ASGs, and you want to create them all from the Master Security Client (MSC), zero indices would be allocated to each of the new ASGs client platforms when they are created.
- If you create an ASG, and you reserve 25 indices for the new ASG client platform, a child ASG created by this platform has a maximum of only 24 indices available to be reserved (one is taken by the creation of the child ASG itself). This continues down the ASG hierarchy as each lower level ASG is created.
- When you create an ASG from the MSC, a maximum of 50 indices (or less if fewer are available) can be reserved. For all other clients, the maximum depends on how many indices were reserved to that client when its ASG was created, and on how many it has subsequently allocated to its ASGs.

Adding a Server to an ASG

To add a server to an ASG:

1. Click the **Access Sub-Group** tab (see Figure 73 on page 116).
2. The name of the ASG appears in the Access Sub-Groups tree. From the Available Servers list, select the servers to add to the ASG.

   Note: TCP/IP accessed servers appear in the Available Servers list even though the ASG client system may not have discovered them yet. These servers can still be added to the Access Sub-Group Servers list.

3. Click the **left arrow** to move the servers to the Access Sub-Group Servers list.
4. Click **Apply** to update servers, adding them to the ASG. The new client can remotely manage the HBAs on those servers using the HBAnyware utility.

Deleting an ASG

Only a leaf node ASG can be deleted. If an ASG has at least one child ASG, you must delete those child ASGs first.

To delete an ASG:

1. From the Access Sub-Group tree, select the leaf node ASG you want to delete.
2. Click **Delete**. A dialog box appears warning you that if you continue the access sub-group will be deleted.
3. Click **Yes**. This operation is immediate. There is no need to click **Apply**.

Restoring an ASG to Its Last Saved Configuration

You can restore an Access Sub-Group (ASG) to its last saved configuration if there are unsaved changes to it.

To restore an ASG to its last saved configuration:

1. Click the **Access Sub-Group** tab (see Figure 73 on page 116).
2. Select the ASG whose configuration you want to restore.

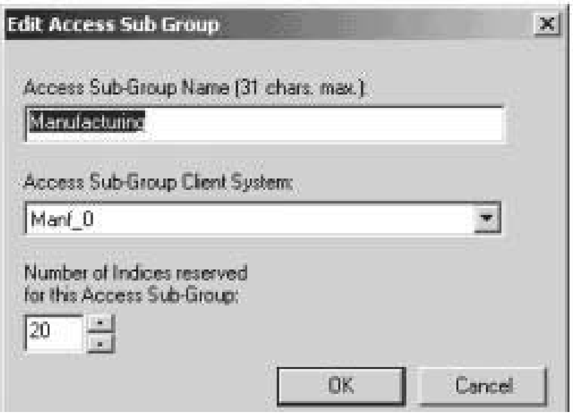
3. Click **Restore**.
4. Click **Apply** to save your changes.

Editing an ASG

You can change the name, client system or reserved indices of an Access Sub-Group (ASG).

To edit an ASG:

1. Click the **Access Sub-Group** tab (see Figure 73 on page 116).
2. Select the ASG you want to edit.
3. Click **Edit**. The Edit Access Sub-Group dialog box appears:


Edit Access Sub Group
Access Sub-Group Name (31 chars. max.)
Access Sub-Group Client System:
Number of Indices reserved for this Access Sub-Group:
OK
Cancel

Access Sub-Group Name (31 chars. max.): Manufacturing

Access Sub-Group Client System: Manf_0

Number of Indices reserved for this Access Sub-Group: 20

Figure 75: Edit Access Sub Group dialog box

4. Change the ASG information:
   - Access Sub-Group Name: Change the name of the ASG. The ASG name is for identification purposes only. It does not provide any security function. Provide a name that logically groups the systems that are part of this ASG.

     The name can contain any alphanumeric characters, symbols or spaces (up to 31). At each level of the security topology, each ASG name must be unique. If the name is not unique for its topology level, an error message informs you of this when you click **OK**.
   - Access Sub-Group Client System: Select the new system to be the client. If the Configurator is running on a system connected to more than one fabric, the client list contains only those systems that can be accessed by the original client of the ASG.
   - Number of indices reserved for this Access Sub-Group: Select the new number of 'indices' to reserve for the client system of the new ASG. This number reflects the number of subsequent 'child' ASGs that you can subsequently create on the new client's system. See page 117 for examples.
5. Click **OK** in the Edit Access Sub-Group dialog box to save your changes.

About Offline ASGs

Sometimes a client system is not online when the HBAnyware Security Configurator is running. In this case, the Access Sub-Group (ASG) for the client appears offline in the ASG tree, much like the following:

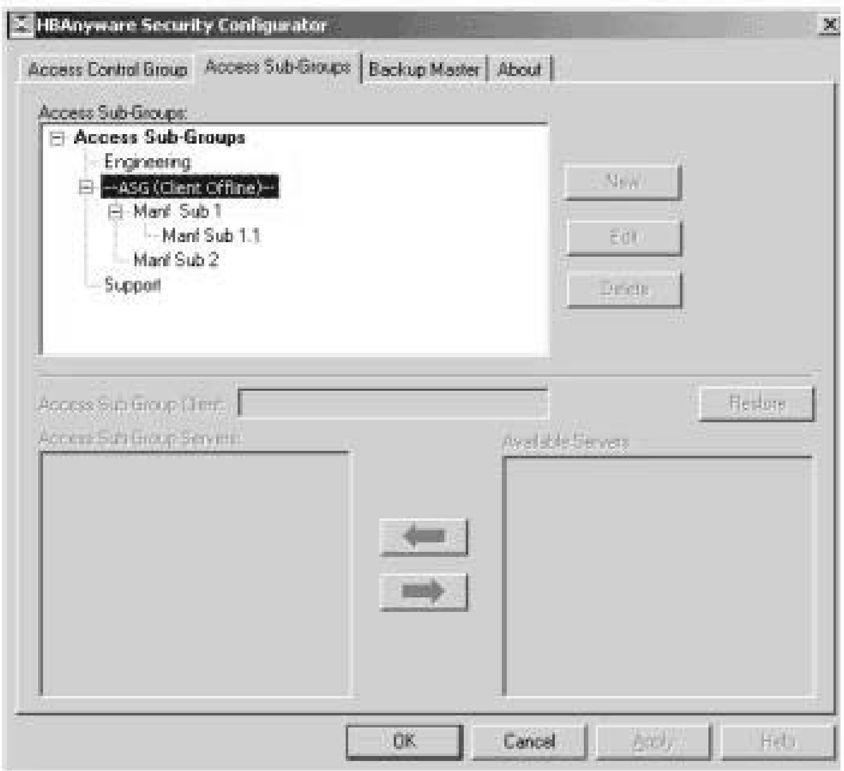


Figure 76: Access Sub-Groups tab - Client System Offline

The offline ASG entry serves as a placeholder for where the real ASG would be in the tree. You cannot modify or delete the entry (although it is removed from the display if all of its child ASGs are deleted).

It is possible to delete the child ASGs of an offline ASG. However, we recommend that you delete them only if the client for the offline ASG is never to be put online again. It is best to delete child ASGs when the parent ASG is online.

If you choose to delete a child ASG, the operation is immediate. There is no need to click **Apply**.

Backup Masters

Introduction

A Backup Master mirrors the security data of the Master Security Client (MSC) in case it has to take over as the MSC if the MSC is unable to operate or is removed from the security configuration. A Backup master system receives all the updates to the security configuration on the MSC. However, you cannot make modifications to the security configuration on a Backup Master.

When the Configurator runs on a Backup Master, the Access Control Group tab looks like the tab on a non-MSC system. The Access Sub-Group tab shows the ASGs, but you cannot change the ASGs (see Figure 70 on page 111).

The Backup Master tab is available only when the HBAnyware Security Configurator is running on the MSC or a Backup Master. Use this tab to set up a system as a Backup Master to the MSC and to replace the MSC with a Backup Master.

Each time you start the HBAnyware Security Configurator on the MSC and no Backup Master is assigned, a message warns you that no Backup Master Client is assigned to the security configuration.

If you run the HBAnyware Security Configurator on a Backup Master, a message warns you that you can only view security information on a Backup Master. Security changes must be made to the MSC.

A Backup Master system receives all the updates that the MSC makes to the security configuration, therefore it is very important that the Backup Master is online when the HBAnyware Security Configurator is running on the MSC. Otherwise, updates to the security configuration are not reflected to the Backup Master. If the Backup Master then becomes the MSC, the security configuration can be corrupted.

Backup Master Eligible Systems

To be eligible to become a Backup Master, a system must not be a client or server in any ASG. In other words, it must be either a server in the MSC's Access Control Group (ACG) or an unsecure system. If it is an unsecure system, it will be secure when it becomes a Backup Master.

Backup Master Tab and Controls

The first time you select the **Backup Master** tab on the MSC, it looks similar to the following:

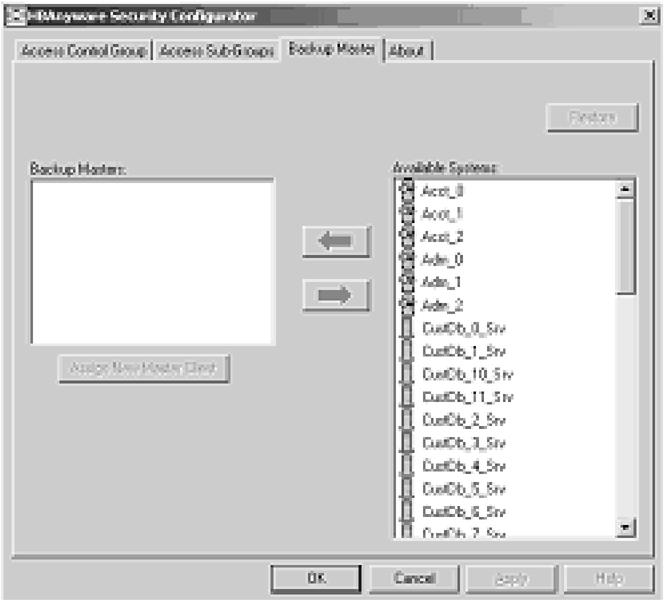


Figure 77: Backup Master tab - First Time Selected

Creating a Backup Master

To create a Backup Master:

1. On the Master Security Client (MSC), start the HBAnyware Security Configurator.
2. Click the **Backup Master** tab.

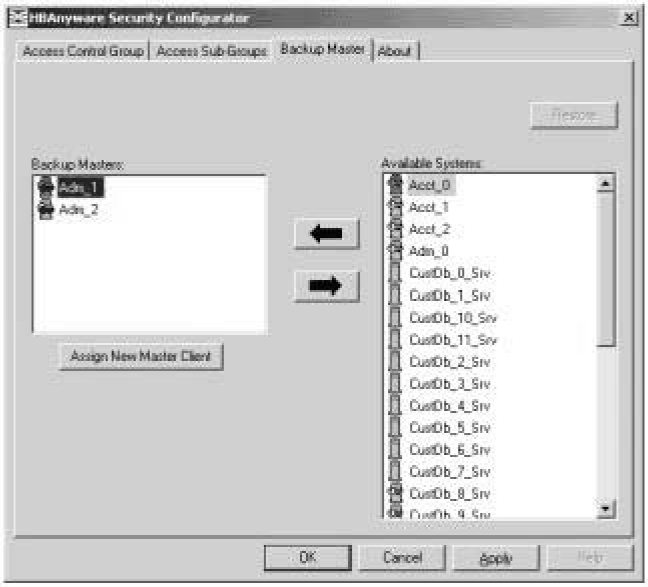


Figure 78: Backup Master tab with Backup Masters

3. Select a system from the Available Systems list.
4. Click the **left arrow** to move the system to the Backup Masters list.
5. Click **Apply** to save your changes.

Reassigning a Backup Master as the New MSC from the Old MSC

Because a Backup Master may have to take over as the Master Security Client (MSC), it must be able to physically access all of the adapters that the MSC can access. If the MSC connects to multiple fabrics, select its Backup Master from the Available Systems list connected to the same fabrics as the MSC.

To reassign a Backup Master as the new MSC from the old MSC:

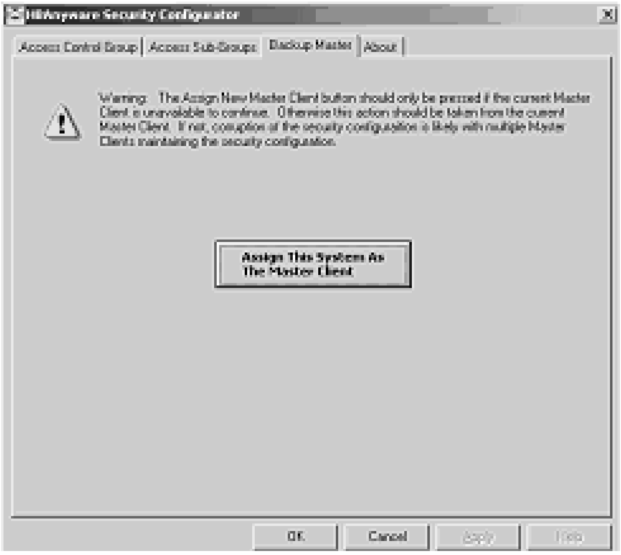
1. On the current MSC, start the HBAnyware Security Configurator.
2. Click the **Backup Master** tab (see Figure 78). In the Backup Masters list, select the Backup Master system that you want to reassign as the MSC.
3. Click **Assign New Master Client**. A dialog box appears and asks if you want to proceed.
4. Click **Yes** on the dialog box. The selected Backup Master becomes the new MSC. The current MSC becomes a server in the new MSC's ACG. After the changes are made, a message indicates that the reassignment is complete.
5. Click **OK**. The Configurator closes because the system is no longer the MSC.

Reassigning a Backup Master as the New MSC from the Backup Master

WARNING: Use this method only if the MSC cannot relinquish control to a Backup Master, for example, if you can no longer boot the MSC or connect to the FC network. Under any other circumstances, if the Backup Master takes over as the MSC, and the MSC is still running or comes back online later, there will be two MSCs for the same security configuration. This eventually leads to corruption of the security configuration.

To reassign a Backup Master as the new MSC from the Backup Master:

1. On the Backup Master system that you want to reassign as the MSC, start the HBAnyware Security Configurator.
2. Click the **Backup Master** tab.



Warning: The Assign New Master Client button should only be pressed if the current Master Client is unavailable to continue. Otherwise this action should be taken from the current Master Client. If not, corruption of the security configuration is likely with multiple Master Clients maintaining the security configuration.

Figure 79: Backup Master “Warning” dialog box

3. Click **Assign This System As The Master Client**. A prompt asks if you want to continue.
4. Click **Yes**. A prompt notifies you that this system is now the new MSC.
5. Click **OK**. The Configurator closes.
6. Restart the HBAnyware Security Configurator to run the former Backup Master as the MSC.

Using the HBAnyware Utility Command-Line Interface

The Command Line Interface (CLI) Client component of the HBAnyware utility provides access to the capabilities of the Remote Management library from a console command prompt. This component is intended for use in scripted operations from within shell scripts or batch files. The CLI Client is a console application named hbacmd. Each time you run this application from the command line, a single operation is performed.

The first parameter of this command is the requested operation. When the specified operation is completed, the command prompt is displayed. Most operations retrieve information about an entity on the SAN and display that information on the console.

Most of the CLI Client commands require one or more additional parameters that specify the nature of the command. A parameter used by many hbacmd commands specifies the World Wide Port Name (WWPN) of the adapter that is the target of the command.

For example, run the following command from the directory in which HBAnyware is installed to display the port attributes for the adapter with the specified WWPN:

```
hbacmd portattrib 10:00:00:00:c9:20:20:20
```

hbacmd can be run in TCP/IP mode by making the first argument h=<host>. For example:

```
hbacmd h=cp-hp5670 listhbas
hbacmd h=138.239.91.121 listhbas
```

Note: For VMware ESX Server systems, the firewall on the ESX Server must be opened to manage systems remotely. To enable TCP port #23333, run the following commands:

```
esxcfg-firewall --openPort 23333,tcp,in,hbanyware
esxcfg-firewall --openPort 23333,tcp,out,hbanyware
```

To verify that the correct port is open, run the following command:

```
esxcfg-firewall -q
```

The TCP port number can be changed. If it is not changed, the default is 23333.

Refer to the VMware Server Configuration Guide for more details on how to configure the ESX firewall.

hbacmd can manage Emulex adapters in systems configured to support CIM, such as systems with VMware ESX 3i installed. Use the following syntax:

```
A> hbacmd <h=ip [: port]> <m=CIM> [u=userid] [p=password]
[n=namespace] <cmd>
B> hbacmd <h=ip [: port]> <m=CIM> <cmd>
```

Before issuing the syntax B, the you should do one of the following:

1. Add the host IP with CIM credentials using the AddHost command. For example:

   ```
   hbacmd <m=CIM> [u=userid] [p=password] [n=namespace] AddHost <ip>
   ```

2. Set the default CIM credentials using the SetCimCred command.

   ```
   hbacmd SetCimCred <userid> <password> <namespace> <port>
   ```

Note: If the command is specified with discovery method "m=CIM" and the CIM credentials (userid, password, or namespace) are not specified then the default value for the missing CIM credential will be obtained in the following order: (a) The information entered using the addhost command is looked up. (b) If no values exist then the information entered using the setcimcred command is used. (c) If no values exist then the following credentials userid = root, password = root, namespace = elxhbacmpi/cimv2 and portnumber = 5988 are used.

For example, run the following command to display a list of HBAs managed for a specified host using CIM interface:

```
C:\Program Files\Emulex\Util\HBAnyware>hbacmd h=10.192.113.128 m=cim u=root
p=root n=elxhbacmpi/cimv2 listhba

Manageable HBA List

Port WWN    : 10:00:00:00:c9:6b:62:2b
Node WWN    : 20:00:00:00:c9:6b:62:2b
Fabric Name: 00:00:00:00:00:00:00:00
Flags       : 00000000
Host Name   : lancer.eng.ma.emulex.com
Mfg         : Emulex Corporation
Serial No. : BG73539764
Port Number: n/a
Mode        : Initiator
Discovery   : CIM

Port WWN    : 10:00:00:00:c9:6b:62:59
Node WWN    : 20:00:00:00:c9:6b:62:59
Fabric Name: 00:00:00:00:00:00:00:00
Flags       : 00000000
Host Name   : lancer.eng.ma.emulex.com
Mfg         : Emulex Corporation
Serial No. : BG73539764
Port Number: n/a
Mode        : Initiator
Discovery   : CIM

C:\Program Files\Emulex\Util\HBAnyware>hbacmd h=10.192.113.128 m=cim u=root
p=root n=elxhbacmpi/cimv2 portattrib 10:00:00:00:c9:6b:62:2b

Port Attributes for 10:00:00:00:c9:6b:62:2b

Node WWN             : 20 00 00 00 c9 6b 62 2b
Port WWN             : 10 00 00 00 c9 6b 62 2b
Port Symname         :
Port FCID            : 0000
Port Type            : Fabric
Port State           : Unknown
Port Service Type    : 12
Port Supported FC4   : 00 00 01 20 00 00 00 01
                       00 00 00 00 00 00 00 00
                       00 00 00 00 00 00 00 00
                       00 00 00 00 00 00 00 00
Port Active FC4      : 00 00 01 00 00 00 00 01
                       00 00 00 00 00 00 00 00
                       00 00 00 00 00 00 00 00
                       00 00 00 00 00 00 00 00
Port Supported Speed: 1 2 4 GBit/sec.
Port Speed           : 4 GBit/sec.
Max Frame Size       : 2048
OS Device Name       :
Num Discovered Ports: 0
Fabric Name          : 00 00 00 00 00 00 00 00
```

- If the parameter 'm=CIM' is specified, then the hbacmd will use the CIM interface to talk to the CIM server running on the ESX server to get the management information.
- If the parameter 'm=CIM' is not specified, then the hbacmd will use the RM interface to talk to the RM server to get the management information.

Using the CLI Client

Syntax Rules

The syntax rules for hbacmd are as follows:

- All CLI Client commands and their arguments are not case sensitive.
- The requested operation must contain at least three characters, or as many as needed to distinguish it from any other operation.
- Whenever a WWPN is specified, individual fields are separated by colons (:) or spaces ( ). When using space separators, the entire WWPN must be enclosed in quotes (").

The CLI Client Command Reference

CLI Client commands are supported for Windows, Solaris SFS and Linux. Only CLI Client commands that are dynamic are supported for VMware ESX Server.

Note: The PersistentBinding, SetPersistentBinding, RemovePersistentBinding, RemoveAllPersistentBinding, BindingCapabilities, BindingSupport and SetBindingSupport commands are not supported for Linux or Solaris.

Note: The BindingCapabilities, BindingSupport, GetLunList, GetLunMaskbyHBA, GetLunMaskbyTarget, PersistentBinding, RescanLuns, RemoveAllPersistentBinding, RemovePersistentBinding, RemoveAllPersistentBinding,SetPersistentBinding, BindingCapabilities, SetBindingSupport, SetLunMask and SetPersistentBinding commands are not supported for VMware ESX.

Note: The following hbacmd commands are supported using the CIM interface: HbaAttributes, PortAttributes, PortStatistics, ServerAttributes, GetDriverParam, GetDriverParamsGlobal, SetDriverParam, Download, AddHost, RemoveHost, Listhba, SetCimCred, and GetCimCred.
The following additional commands are supported to manage the adapters on the ESX4i platform with SMI-S v2.x.x provider: ChangeWWN, GetWWNCap, ReadWWN, RestoreWWN, CEE Download, GetCEEParams, SetCEEParams, GetXcvrData, LoadList, Reset and GetVPD.
All other hbacmd commands will return an error message “This command is currently not available via the CIM interface”. Within this supported command list, there are some entries that are not available in the SMI-S provider v1.2.1 and v2.x.x. For those entries, hbacmd will show “Not Available”. For details on parameters not supported for specific commands, see Table 4.
If you are running older adapter firmware or managing a remote host running HBAnyware version 4.0, the PG 1 and PG 2 settings and all bandwidth settings are disabled and the Enable Host Ethernet PFC Linkage is disabled.

Note: The following hbacmd commands are supported for managing COMSTAR target mode adapter ports: ListHBAs, Download, Reset, GetVPD, GetXcvrData, HbaAttributes, PortAttributes, ServerAttributes, GetPortStatistics, GetDriverParams, GetDriverParamsGlobal, SetDriverParam, SetDriverParamDefaults, SaveConfig, DriverConfig, ExportSanInfo, GetCEEParams, SetCEEParams, CEEDownload, SetPGBW, GetPGInfo, SetPGMemberships, SetCEEPGBW, GetFIPParams, SetFIPParam, GetFCFInfo, ListVMs, DeleteDumpFiles, GetDumpDirectory, GetRetentionCount and SetRetentionCount.

Parameters Not Supported

Note: X indicates the attribute is not supported on the particular OS.

Table 4: Parameters Not Supported

Command	Attribute	Supported on ESX 3i U2 & U3 via CIM Provider v 1.2.1.x	Supported on ESX 4 via CIM Provider v 2.0.22.1 or later	Supported on ESX 3i U4 via CIM Provider v 2.0.9.x
listhba	Port WWN			
	Node WWN			
	Fabric Name	X		
	Flags	X		
	Host Name			
	Mfg			
	Serial No.			
	Port Number			
	Mode			
	Discovery			
hbaattributes	Host Name			
	Manufacturer			
	Serial Number			
	Model			
	Model Desc			
	Node WWN			
	Node Symname			
	HW Version			
	Opt ROM Version	X	X	X
	FW Version			

Table 4: Parameters Not Supported (Continued)

Command	Attribute	Supported on ESX 3i U2 & U3 via CIM Provider v 1.2.1.x	Supported on ESX 4 via CIM Provider v 2.0.22.1 or later	Supported on ESX 3i U4 via CIM Provider v 2.0.9.x
	Vendor Spec ID	X		
	Number of Ports			
	Driver Name			
	Device ID			
	HBA Type			
	Operational FW	X	X	X
	SLI1 FW	X		
	SLI2 FW	X		
	SLI3 FW	X		
	IEEE Address	X		
	Boot Code	X		
	Driver Version			
	Kernel Version	X		
	HBA Temperature			
portattributes	Node WWN			
	Port WWN			
	Port Symname			
	Port FCID	X		
	Port Type			
	Port State			
	Port Service Type			
	Port Supported FC4			
	Port Active FC4			
	Port Supported Speed			
	Port Speed			
	Max Frame Size			
	OS Device Name	X		

Table 4: Parameters Not Supported (Continued)

Command	Attribute	Supported on ESX 3i U2 & U3 via CIM Provider v 1.2.1.x	Supported on ESX 4 via CIM Provider v 2.0.22.1 or later	Supported on ESX 3i U4 via CIM Provider v 2.0.9.x
	Num Discovered Ports	X		
	Fabric Name	X		
serverattributes	Host Name			
	FW Resource Path	X	X	X
	DR Resource Path	X	X	X
	HBAnyware Server Version			
	Host OS Version	X		
portstatistics	Exchange Count	X		
	Responder Exchange Count	X		
	Tx Seq Count	X		
	Rx Seq Count	X		
	Tx Frame Count			
	Rx Frame Count			
	Tx Word Count			
	Rx Word Count			
	Tx KB Count			
	Rx KB Count			
	LIP Count			
	NOS Count			
	Error Frame Count			
	Dumped Frame Count			
	Link Failure Count			
	Loss of Sync Count			

Table 4: Parameters Not Supported (Continued)

Command	Attribute	Supported on ESX 3i U2 & U3 via CIM Provider v 1.2.1.x	Supported on ESX 4 via CIM Provider v 2.0.22.1 or later	Supported on ESX 3i U4 via CIM Provider v 2.0.9.x
	Loss of Signal Count			
	Prim Seq Prot Err Count			
	Invalid Tx Word Count			
	Invalid Rx Frame CRC Cnt			
	Link Transition Count	X		
	Active RPI Count	X		
	Active XRI Count	X		
	Rx Port Busy Count			
	Rx Fabric Busy Count			
	Primary Sequence Time-out	X		
	Elastic Buffer Overrun	X		
	Arbitration Time-out	X		
GetVPD		X		
GetxcvrData		X		
LoadList		X		
SetDriverParam		X		X
WWN Management		X		

Note: The following hbacmd commands will be supported for managing target mode HBAs: ListHBAs, Download, Reset, GetVPD, GetXcvrData, HbaAttributes, PortAttributes, ServerAttributes, GetPortStatistics, GetDriverParams, GetDriverParamsGlobal, SetDriverParam, SetDriverParamDefaults, SaveConfig, DriverConfig, ExportSanInfo, GetCEEParams, SetCEEParams, CEEDownload, SetPGBW, GetPGInfo, SetPGMemberships, SetCEEPGBW, GetFIPParams, SetFIPParam, GetFCFInfo, and ListVMs.
All other hbacmd commands will return an error message "Not Supported for Target Mode Adapters".

Note: For the LoadList command, the attribute Program ID is displayed as “Not Available”, on ESX 3i U4 via CIM Provider v 2.0.9.x.

Read-Only Mode

The CLI (HBACMD) does not allow the execution of certain commands when the HBAnyware utility is configured for read-only mode. An error message will be displayed if such a command is attempted: Error: Read-only management mode is currently set on this host. The requested command is not permitted in this mode.

Help Commands

The “help” commands listed below list the various levels of help for a particular 'boot' area.

Help

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: HbaCmd Help

Description: Shows a list of all help commands for the HBAnyware CLI Client application.

Parameters: None

Help Boot

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: HbaCmd Help Boot

Description: Shows a list of all help commands for the boot commands.

Parameters: None

Help BootParams

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd Help BootParams <Parameter Name>

Description: Shows a summary of parameter settings for the adapter and the boot device. Several parameters have detailed help available.

```
hbacmd Help BootParams <parameter name>
```

Parameter Name (optional) - Specify one of the following boot parameters: AutoScan, BootTargetScan, DevicePathSelection, LinkSpeed, PlogiRetryTimer, or BootParams Topology.

Help GetBootParams

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd Help GetBootParams

Description: Shows help for the GetBootParams command.

Parameters:

WWPN - World Wide Port Name of Object adapter

Type - None

Help SetBootParams

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd Help SetBootParams

Description: Shows help for the SetBootParams command.

Parameters: None

Attributes Commands

HBAAttributes

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd HBAAttributes <WWPN>

Description: Shows a list of all adapter attributes.

Parameters:

WWPN - World Wide Port Name of the adapter whose attributes you want to view.

PortAttributes

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd PortAttributes <WWPN>

Description: Shows a list of all port attributes for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose port attributes you want to view.

PortStatistics

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd PortStatistics <WWPN>

Description: Shows all port statistics for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose port statistics you want to view.

ServerAttributes

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd ServerAttributes <WWPN>

Description: Shows a list of server attributes for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose server attributes you want to view.

Authentication Commands

AuthConfigList

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd AuthConfigList <WWPN>

Description: Returns the list of WWPNs that have an authentication connection configuration with the specified adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose configuration data you want to retrieve.

DeleteAuthConfig

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd DeleteAuthConfig <WWPN1> <WWPN2> <PasswordType> <Password>

Description: Deletes the authentication configuration on the adapter.

Parameters:

WWPN1 - World Wide Port Name of the adapter whose authentication configuration you want to delete.

WWPN2 - Must be ff:ff:ff:ff:ff:ff:ff:ff

PasswordType - 1 = ASCII, 2 = Hex (binary), 3 = Password not yet defined

Password - Current password value.

GetAuthConfig

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd GetAuthConfig <WWPN1> <WWPN2>

Description: Retrieves the authentication configuration for the adapter.

Parameters:

WWPN1 - World Wide Port Name of the adapter whose configuration data you want to retrieve.

WWPN2 - Must be ff:ff:ff:ff:ff:ff:ff:ff

GetAuthStatus

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd GetAuthStatus <WWPN1> <WWPN2>

Description: Returns the current status for the authentication connection specified by WWPN 1 and 2 (adapter and the switch). Includes the current authentication state (connected, failed, ...). Currently authenticated connections will specify the hash algorithm and DH group used in the DHCHAP associated with this connection. Failed statue will include failure reason.

Parameters:

WWPN1 - World Wide Port Name of the adapter whose status you want to check.

WWPN2 - Must be ff:ff:ff:ff:ff:ff:ff:ff

InitiateAuth

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd InitiateAuth <WWPN1> <WWPN2>

Description: Initiates the authentication configuration on the adapter.

Parameters:

WWPN1 - World Wide Port Name of the adapter whose authentication configuration you want to initiate.

WWPN2 - Must be ff:ff:ff:ff:ff:ff:ff:ff

SetAuthConfig

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd SetAuthConfig <WWPN1> <WWPN2> <PasswordType> <Password> <Parameter> <Value>

Description: Sets the authentication configuration for the adapter.

Parameters:

WWPN1 - World Wide Port Name of the adapter whose authentication configuration you want to set.

WWPN2 - Must be ff:ff:ff:ff:ff:ff:ff:ff

PasswordType - 1 = ASCII, 2 = Hex (binary), 3 = Password not yet defined

Password - Current password value

Parameter - Parameters include Mode, Timeout, Bi-directional, Hash-priority, DH-priority, Re-authentication, Re-authentication-interval

Value - Parameter-specific value: Mode = <disabled, enabled, passive>, Timeout = time in seconds, Bi-directional = <disabled, enabled>, Hash-priority = <md5, sha1> (md5 = first md5, then sha1; sha1 = first sha1, then md5), DH-priority = <1,2,3,4,5>, any combination up to 5 digits, Re-authentication = <disabled, enabled>, Re-authentication-interval = < 0, 10 - 3600>

SetPassword

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd SetPassword <WWPN1> <WWPN2> <Flag> <Cpt> <Cpw> <Npt> <Npw>

Description: Sets the password for the adapter.

Parameters:

WWPN1 - World Wide Port Name of the adapter for which you want to set a password.

WWPN2 - Must be ff:ff:ff:ff:ff:ff:ff:ff

Flag - 1 = Local (password used by adapter when adapter authenticates to the switch), 2 = Remote (password used by adapter when switch authenticates to the adapter)

Cpt - Current password type is 1 = ASCII or 2 = Hex (binary), 3 = Password not yet defined

Cpw - Current password value.

Npt - New password type is 1 = ASCII or 2 = Hex (binary)

Npw - New password value

Boot Commands

<…> = Required, […] = Optional

EnableBootCode

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd EnableBootCode <WWPN> <Flag>

Description: Enables or disables the boot code on the adapter. If the boot code is disabled, the adapter will not boot from SAN, regardless of the value for the EnableBootFromSan boot param. If it is enabled, the adapter will boot from the SAN if the EnableBootFromSan parameter is also enabled.

Parameters:

WWPN - World Wide Port Name of Object adapters

Flag - E = Enable the boot code, D = Disable the boot code

GetBootParams

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd GetBootParams <WWPN> <Type>

Description: Shows the boot parameters. If any arguments are missing or invalid, a suitable error is reported. If all arguments are ok, the appropriate RM_GetBootParamsXX call is made, and the data is displayed in tabular form.

Parameters:

WWPN - World Wide Port Name of Object adapter.

Type - X86, EFI, OB

SetBootParam

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbaCmd SetBootParam <WWPN> <Type> <Param> <Value1> [BootDev <Value2>]

Description: Performs a high-level read-modify-write operation.

- For Adapter Params, the BootDev keyword and value must be omitted; otherwise, an error is reported.
- For Boot Device Params (OpenBoot) the BootDev keyword and value must be omitted; otherwise, an error is reported.
- For Boot Device Params (X86 and EFI) the BootDev keyword and value are required.

Parameters:

WWPN - World Wide Port Name of Object adapter.

Type - X86, EFI, OB

Param - Parameter Name

Value1 - Parameter Value

Value2 - Boot Device Entry Number: {0 - 7}

CEE Commands

Note: CEE commands are for CEE management of LP21000-M and LP21002-M HBAs only.

CEEDownload

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd CEEDownload <WWPN> <Filename>

Description: Updates the CEE firmware on the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter.

Filename - Name of the file to download.

GetCEEParams

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd GetCEEParams <WWPN>

Description: Shows the Internal Host PFC flag value and DCBX mode (i.e. CEE version).

Parameters:

WWPN - World Wide Port Name of the adapter.

SetCEEParam

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SetCEEParam <WWPN> <Param> <Value>

Description: Set or clear the Internal Host PFC flag. SetCEEParam configures one of the CEE parameters.

Parameters:

Pausetype - 1 = Standard, 2 = Per Pause Priority

pfcflag - 0 = Clear, 1= Set

Uifporttype - 1 = Access, 2 = Trunk

Note: The parameters pfcpriority and fcoepriority cannot be set with this command. If these parameters are specified an error message will be displayed. Use the command SetPGMemberships to set these parameters. The parameters will continue to work in order to support backward compatibility with remote HBAnyware 4.0 host.

GetPGInfo

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd GetPGInfo <WWPN>

Description: Shows the three priority groups for the port with there priority membership and bandwidth percentages.

Parameters:

WWPN - World Wide Port Name of the adapter.

SetPGMemberships

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SetPGMemberships <WWPN> <PFC> <PG0> <PG1> <PG2>

Description: Set the priority group priorities and PFC priorities for the port. PFC is equivalent to the "pfcpriority" parameter (from the "SetCEEParam" command) in HBAnyware 4.0. The values must be set according to the following rules:

1. The priorities can range from 0 to 7.
2. Only a single priority can be specified for PG0. PG0 is equivalent to the "fcoepriority" parameter (from the "SetCEEParam" command) in HBAnyware 4.0.
3. PFC, PG1 and PG2 are specified by a comma separated list of values (e.g. 3,5,7).
4. PFC priority must contain at least the PG0 priority.

5. Each of the eight priorities must be specified only once in the PG0, PG1 and PG2 parameters.
6. Except for the PG0 priority, the PFC priorities can be specified only in the PG1 priority or the PG2 priority list, but not both.
7. The PG1 or PG2 priorities can be set to none. To specify none, use "-" for the argument.

Parameters:

WWPN - World Wide Port Name of the adapter.

PFC - PFC Priority

PG0 - Priority Group 0 Priorities

PG1 - Priority Group 1 Priorities

PG2 - Priority Group 2 Priorities

Example

This command sets PFC priority to 3, PG0 priority to 3, PG1 priority to 0, 2, 4, and 6 and PG2 priority to 1, 5, and 7.

hbacmd setpgmemberships 10:00:00:00:c9:3c:f7:88 3 3 0,2,4,6 1,5,7

SetPGBW

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SetPGBW <WWPN> <BW0> <BW1> <BW2>

Description: Set the bandwidth percentages for each of the three priority groups supported.

The bandwidth percentages must add up to 100% and cannot exceed the bandwidth percentage for the priority group (e.g. BW1 cannot be greater than 40).

Parameters:

WWPN - World Wide Port Name of the adapter.

BW0 - Bandwidth percentage for the priority group 0

BW1 - Bandwidth percentage for the priority group 1

BW2 - Bandwidth percentage for the priority group 2

Example

This command sets the priority group 0 bandwidth to 40% and the priority groups 2 and 3 bandwidths to 30%.

hbacmd setpgbw 10:00:00:00:c9:3c:f7:88 40 30 30

GetFIPParams

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd GetFIPParams <WWPN>

Description: Show the FIP parameters for the port.

Parameters:

WWPN - World Wide Port Name of the adapter.

SetFIPParam

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SetFIPParam <WWPN> <Param> <Value>

Description: Set the various FIP parameters for the port.

Parameters:

WWPN - World Wide Port Name of the adapter.

fipstate - 0 = Disabled, 1 = Enabled

pfabric - 8 byte fabric name

pswitch - 8 byte switch name

vlanid - 2 byte VLAN ID

fcmap - 24 bit vendor OUI

The fcpmap parameter can only be set when the FIP state is disabled. The other parameters can only be set when the FIP state is enabled.

GetFCFInfo

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd GetFCFInfo <WWPN>

Description: Show the FCF information for the port.

Parameters:

WWPN - World Wide Port Name of the adapter.

Diagnostic Commands

Note: Diagnostic commands are not available using the CIM interface.

EchoTest

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd EchoTest <WWPN Source> <WWPN Destination> <Count> <StopOnError> <Pattern>

Description: Runs the echo test on adapters.

Note: Support for remote adapter is TCP/IP access only. The EchoTest command fails if the target WWPN does not support the ECHO ELS command.

Parameters:

Source WWPN - World Wide Port Name of the originating adapter.

Destination WWPN - World Wide Port Name of the destination (echoing) adapter.

Count - Number of times to run the test. 0 = run test infinitely

StopOnError - Should the test be halted on Error? 0 = No halt, 1 = Halt

Pattern - Hexadecimal data pattern to transmit (up to 8 characters)

GetBeacon

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd GetBeacon <WWPN>

Description: Shows the current beacon status for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose current beacon you want to view.

GetXcvrData

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: GetXcvrData <WWPN>

Description: Displays the transceiver information such as vendor name, serial number, part number and so on.

Parameters:

WWPN: World Wide Port Name of the adapter port.

LoadList

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd LoadList <WWPN>

Description: Shows the flash load list data for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose flash load list data you want to view.

LoopBackTest

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd loopback <WWPN> <Type> <Count> <StopOnError> <Pattern>

Description: Runs the loop test on the adapter specified by the WWPN.

Note: External loopback tests can be run on hosts being managed locally or through TCP/IP-based management.

Note: Internal and External Loopback tests are not available for LP2100 and LP21002 adapters.

Parameters:

WWPN - World Wide Port Name of the adapter on which you want to run loopback.

Type - 0 = PCI LoopBack Test, 1 = Internal LoopBack Test, 2 = External LoopBack Test

Count - Number of times to run the test (0 = run test infinitely, Range = 1...99,999)

StopOnError - Should the test be halted on Error? 0 = No halt, 1 = Halt

Pattern - Hexadecimal data pattern to transmit (up to 8 characters).

LoopMap

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd LoopMap <WWPN>

Description: Shows the arbitrated loop map data for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose arbitrated loop map data you want to view.

PCIData

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server.

Syntax: hbacmd PCIData <WWPN>

Description: Shows PCI configuration data for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose configuration data you want to view.

HBACMD has a command that displays wakeup parameter information, much the same way that HBAnyware displays it in its own control field.

Wakeup Parameters:

```
Initial Load:    0x02B81991 0x00555637
Flags:           0x00000000
Boot BIOS:       0x03B11713 0x00101303
SLI-1:           0x06B21991 0x00103411
SLI-2:           0x07B21991 0x00103411
Has Expansion Rom: 1
SLI-3:           0x00000000 0x00000000
SLI-4:           0x00000000 0x00000000
Expansion Rom:      0x03B11713 0x00101303
```

The changes suggested for HBAnyware's GUI also apply to this command's output.

PostTest

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd PostTest <WWPN>

Description: Runs the POST on the adapter. Support for a remote adapter is TCP/IP access only.

Parameters:

WWPN - World Wide Port Name of the adapter on which you want to run a POST.

SetBeacon

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SetBeacon <WWPN> <BeaconState>

Description: Sets the current beacon status for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose beacon you want to change.

BeaconState - New state of the beacon: 0 = Off, 1= On

Wakeup

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd Wakeup <WWPN>

Description: Shows wakeup parameter data for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose wakeup parameter data you want to view.

Driver Parameter Commands

Note: Whenever you chose to set a temporary driver parameter, that is “not permanently”, the parameter is set on each adapter. This method is slightly different then the way it is done for a permanently changed driver parameter. Because of this, the temporarily changed driver parameter must be viewed as an adapter-specific change. To see this change, use GetDriverParameter rather than GetDriverParameterGlobal. Also, when you run SaveConfig, you must run it with the N option (adapter-specific). This will gather all the values saved on that adapter. This command must be used cautiously.

DriverConfig

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Note: For VMware ESX Server: When the DriverConfig driver command is used to set a driver parameter persistently and/or requires a reboot, the ramdisk must be rebuilt.

To rebuild the ramdisk for ESX 4.0, type:

```
# esxcfg-boot --sched-rdbuild
# reboot
```

To rebuild the ramdisk for ESX 3.5, type:

```
# esxcfg-boot -b
# reboot
```

Syntax: hbacmd DriverConfig <WWPN> <FileName> <Flag>

Description: Sets all driver parameters for the adapter to the driver parameter values contained in the specified .dpv file type. The .dpv file’s driver type must match the driver type of the host platform adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose driver parameters you want to set

FileName - Name of the .dpv file (the file is stored in the Emulex Repository directory)

Flag - G = Make change global (all HBAs on this host), N = Make change non-global (adapter-specific)

GetDriverParams

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server. For VMware ESX Server version 3.5.0 or earlier, the driver uses the DriverParams command, but it has the same format as GetDriverParams.

Syntax: hbacmd GetDriverParams <WWPN>

Description: Shows the name and values of each driver parameter for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose driver parameters you want to view.

GetDriverParamsGlobal

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server. For ESX Server version 3.5.0 or earlier, the driver uses the DriverParamsGlobal command, but it has the same format as GetDriverParamsGlobal.

Syntax: hbacmd GetDriverParamsGlobal <WWPN>

Description: Shows the name and the global value of each driver parameter for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose driver parameter global names and values you want to view.

SaveConfig

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SaveConfig <WWPN> <FileName> <Flag>

Description: Saves the specified adapter's driver parameters to a file. The resulting file contains a list of driver parameter definitions in ASCII file format with definitions delimited by a comma. Each definition is of the form: `<parameter-name>=<parameter-value>`.

Saves either the values of the global set or those specific to the adapter. The file created by this command is stored in the Emulex Repository directory.

Parameters:

WWPN - World Wide Port Name of the adapter whose configuration data you want to save.

FileName - Name of the file that contains the driver parameters list.

Flag - G = Save the global parameter set, N = Save the local (adapter-specific) parameter set

SetDriverParam

Note: For VMware ESX Server: When the SetDriverParam driver command is used to set a driver parameter persistently and/or requires a reboot, the ramdisk must be rebuilt.

To rebuild the ramdisk for ESX 4.0, type:

```
# esxcfg-boot --sched-rdbuild
# reboot
```

To rebuild the ramdisk for ESX 3.5, type:

```
# esxcfg-boot -b
# reboot
```

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SetDriverParam <WWPN> <Flag1> <Flag2> <Param> <Value>

Description: Allows you to change the value of a driver parameter and designate the scope of that change.

Parameters:

WWPN - World Wide Port Name of the adapter whose driver parameters you want to change.

Flag1 - L = Make change local for this adapter only, G = Make change global (all adapters on this host)

Flag2 - P = Make change permanent (persists across reboot), T = Make change temporary

Note: For VMware ESX Server version 3.5.0 or earlier, CtrlWord - P = Make change permanent, G = Make change global, B = Both, N = Neither. Because P and B are not supported on VMware ESX Server you can only use G or N.

Param - Name of the parameter to modify.

Value - New value you want to assign to the parameter (Input as decimal, prefix with 0x to input as hex).

SetDriverParamDefaults

Note: For VMware ESX Server: When the SetDriverParamDefaults driver command is used to set a driver parameter persistently and/or requires a reboot, the ramdisk must be rebuilt.

To rebuild the ramdisk for ESX 4.0, type:

```
# esxcfg-boot --sched-rdbuild
# reboot
```

To rebuild the ramdisk for ESX 3.5, type:

```
# esxcfg-boot -b
# reboot
```

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SetDriverParamDefaults <WWPN> <Flag1> <Flag2>

Description: Changes all values to the default for the adapter(s).

Parameters:

WWPN - World Wide Port Name of the adapter whose values you want to change to the default.

Flag1 - L = Make changes local for this adapter only, G = Make changes global (all adapters on this host)

Flag2 - P = Make changes permanent (persists across reboot), T = Make changes temporary

Dump Commands

Caution: Disruption of service can occur if a diagnostic dump is run during I/O activity.

Note: The diagnostic dump feature enables you to create a "dump" file for a selected adapter. Dump files contain various information such as firmware version, driver version, and so on. This information is particularly useful when troubleshooting an adapter. (Not available in read-only mode.)

DeleteDumpFiles

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd DeleteDumpFiles <WWPN>

Description: Deletes all diagnostic dump files for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose diagnostic dump files you want to delete.

Dump

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server.

Syntax: hbacmd dump <WWPN>

Description: Displays the maximum number of diagnostic dump files that be can stored for an adapter. Creates a diagnostic dump file in the hbacmd dump file directory.

Parameters:

WWPN - World Wide Port Name of the adapter whose dump information you want to view.

GetDumpDirectory

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd GetDumpDirectory <WWPN>

Description: Displays the dump file directory associated with the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter on which you want to view the dump directory.

GetRetentionCount

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd GetRetentionCount <WWPN>

Description: Displays the maximum number of diagnostic dump files stored for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter on which you want to get the retention count.

SetRetentionCount

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd SetRetentionCount <WWPN> <Value>

Description: Specifies the maximum number of diagnostic dump files stored for the adapter. When the number reaches the retention count limit, the next dump operation causes the oldest diagnostic dump files for that adapter to be deleted.

Parameters:

WWPN - World Wide Port Name of the adapter on which you want to set the retention count.

Value - Value you want to assign to the set retention count.

LUN Masking Commands

Note: The SaveConfig, GetLunMaskbyHBA, GetLunMaskbyTarget, RescanLuns, SetLunMask, DriverConfig, SetDriverParamDefaults and GetAutoConfig commands do not exist for ESX Server or Solaris.

GetLunList

Supported by: Windows and Solaris SFS

Syntax: hbacmd GetLunList <HBA WWPN> <Target WWPN> <Option>

Description: Queries for the presence of any LUNs.

Parameters:

HBA WWPN - World Wide Port Name of the adapter you want to query.

Target WWPN - World Wide Port Name of the target you want to query.

Option - 0 = Get information from driver, 1 = Get information from configuration

GetLunUnMaskbyHBA

Supported by: Windows and Solaris SFS

Syntax: hbacmd GetLunUnMaskByHBA <HBA WWPN> <Option>

Description: Queries for the presence of any unmasked LUNs by adapter.

Parameters:

HBA WWPN - World Wide Port Name of the adapter you want to query.

Option - 0 = Get information from driver, 1 = Get information from configuration

GetLunUnMaskbyTarget

Supported by: Windows and Solaris SFS

Syntax: hbacmd GetLunUnMaskByTarget <HBA WWPN> <Target WWPN> <Option>

Description: Queries for the presence of any unmasked LUNs by target.

Parameters:

HBA WWPN - World Wide Port Name of the adapter you want to query.

Target WWPN - World Wide Port Name of the target you want to query.

Option - 0 = Get information from driver, 1 = Get information from configuration

RescanLuns

Supported by: Windows and Solaris SFS

Syntax: hbacmd RescanLuns <HBA WWPN> <Target WWPN>

Description: Rescans for the presence of any LUNs.

Parameters:

HBA WWPN - World Wide Port Name of the adapter you want to rescan.

Target WWPN - World Wide Port Name of the target you want to rescan.

SetLunMask

Supported by: Windows and Solaris SFS

Syntax: hbacmd SetLunMask <HBA WWPN> <Target WWPN> <Option> <Lun> <LunCount> <MaskOp>

Description: Masks the specified LUNs.

Parameters:

HBA WWPN - World Wide Port Name of the adapters.

Target WWPN - World Wide Port Name of the target.

Option - 0 = Send information to the driver, 1 = Send information to configuration (make persistent), 2 = Send information to both

Lun - Starting LUN number.

LunCount - Number of LUNs.

MaskOp - A = Mask LUN, B = Clear unmask target level, C = Clear unmask HBA level, D = Unmask LUN, E = Unmask target level, F = Unmask HBA level

Miscellaneous Commands

<…> = Required, […] = Optional

Download

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd Download <WWPN> <FileName>

Description: Loads the firmware image to the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter to which you want to load firmware.

FileName - File name of the firmware image to load (this can be any file accessible to the CLI client application)

ExportSANInfo

Note: Emulex recommends that you redirect this output to a file with proper extension. For example: '.xml' for XML-formatted files or '.csv' for CSV-formatted files.

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd exportsaninfo [format]

Note: [format] is optional. If the format parameter is specified as csv, adapter information is shown in csv format. If the format parameter is specified as xml, adapter information is shown in xml format. Leaving the format parameter blank will show the data in xml format.

Description: For reporting purposes, captures the adapter information in xml or csv format.

Parameters: None

GetVPD

Supported by: Windows, Solaris SFS Linux and VMware ESX Server

Syntax: hbacmd GetVPD <WWPN>

Description: Shows the port’s Vital Product Data (VPD)

Parameters:

WWPN - World Wide Port Name of the adapter whose VPD you want to view.

ListHBAs

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd ListHBAs

Description: Shows a list of the manageable Emulex adapters discovered by Fibre Channel (in-band) and by TCP/IP (out-of-band).

Note: The Mode field indicates whether the HBA is operating as a “Target” or an “Initiator”.

Parameters: None

Reset

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd Reset <WWPN>

Description: Resets the adapter. An adapter reset can require several seconds to complete, especially for remote devices. Once the reset command is completed, the system command prompt is displayed.

Parameters:

WWPN - World Wide Port Name of the adapter you want to reset.

TargetMapping

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd TargetMapping <WWPN>

Description: Shows a list of mapped targets and the LUNs for the port.

Parameters:

WWPN - World Wide Port Name of the adapter whose target mapping you want to view.

Version

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd Version

Description: Shows the current version of the HBAnyware CLI Client application.

Parameters: None

GetCimCred

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd GetCimCred

Description: Shows the encrypted value of password.

Parameters:

None.

SetCimCred

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd SetCimCred <username> <password> <namespace> <portnum>

Description: Set the default CIM credentials. All the four credentials i.e. username, password, namespace and portnumber must be specified. Default credentials are used if any credential is missed in the hbacmd command argument. Once the default credentials for a host are set successfully, any other command can be issued just by specifying m=CIM.

Parameters:

username - Login User ID of the VMWare ESX server.

password - Login password of the VMWare ESX server.

namespace - Namespace where the Emulex provider is registered in the sfcb cimom of VMWare ESX server i.e. elxhbacmpi/cimv2

portnum - Port number of the sfcb cimom listening to i.e. 5988 (HTTP) or 5989 (HTTPS)

Addhost

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd addhost host_address

Description: Adds a host to the hosts file. The host_address can be an IP address or a host name.

Parameters:

host_address - Host to add

Removehost

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd removehost host_address

Description: Removes a host from the hosts file. The host_address can be an IP address or a host name.

Parameters:

host_address - Host to remove

Persistent Binding Commands

Note: The PersistentBinding, SetPersistentBinding, RemovePersistentBinding, RemoveAllPersistentBinding, BindingCapabilities, BindingSupport and SetBindingSupport commands are not supported for Linux or Solaris.

Note: The PersistentBinding, SetPersistentBinding, RemovePersistentBinding, RemoveAllPersistentBinding, BindingCapabilities, BindingSupport and SetBindingSupport commands are not supported in VMware ESX Server.

Note: In order for a binding to take effect immediately (SetPersistentBinding parameter, Scope = I or B), the SCSIBus and SCSITarget must match the SCSI bus and SCSI target to which the FC target is already automapped. If automapping is disabled, the binding will take effect immediately if the FC target is not already persistently bound and the specified SCSIBus and SCSITarget are available to be persistently bound. Also, the BindType must match the currently active bind type. Otherwise, you will be notified that you must reboot the system to cause the persistent binding to become active.

AllNodeInfo

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd AllNodeInfo <WWPN>

Description: Shows target node information for each target accessible by the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose target node information you want to view.

BindingCapabilities

Supported by: Windows and Solaris SFS

Syntax: hbacmd BindingCapabilities <WWPN>

Description: Shows the binding capabilities present for the adapter. If a binding is configured, it means the binding is maintained across reboots.

Parameters:

WWPN - World Wide Port Name of the adapter whose binding capabilities you want to view.

BindingSupport

Supported by: Windows and Solaris SFS

Syntax: hbacmd BindingSupport <WWPN> <Source>

Description: Shows the binding support available for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose binding support you want to view.

Source - C = Configuration support, L = Live support

PersistentBinding

Supported by: Windows and Solaris SFS

Syntax: hbacmd PersistentBinding <WWPN> <Source>

Description: Specifies which set of persistent binding information is requested: the configured or live state of any present binding.

Parameters:

WWPN - World Wide Port Name of the adapter whose persistent binding information you want to specify.

Source - C = Configuration, L = Live

SetPersistentBinding

Supported by: Windows and Solaris SFS.

Syntax: hbacmd SetPersistentBinding <WWPN> <Scope> <BindType> <TargetId> <SCSIBus> <SCSITarget>

Description: Sets a persistent binding between an FC target and a SCSI Bus and target. The binding can be to a target WWPN, target WWNN, or target D_ID.

Parameters:

WWPN - World Wide Port Name of the adapter whose persistent bindings you want to set.

Scope - P = Binding is permanent (survives across reboot), I = Binding is immediate, B = Binding is both

permanent and immediate.

BindType - P = Enable binding by WWPN, N = Enable binding by WWNN, D = Enable binding by D_ID

TargetId - Target WWPN if BindType = P, Target WWNN if BindType = N, Target D_ID if BindType = D

SCSIBus - Bus number of SCSI device.

SCSITarget - Target number of SCSI device.

RemoveAllPersistentBinding

Supported by: Windows and Solaris SFS

Syntax: hbacmd RemoveAllPersistentBinding <WWPN>

Description: Removes all persisting bindings for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose persistent bindings you want to remove.

RemovePersistentBinding

Supported by: Windows and Solaris SFS

Syntax: hbacmd RemovePersistentBinding <WWPN> <BindType> <ID> <SCSIBus> <SCSITarget>

Description: Removes persistent binding between an FC target and a SCSI Bus and target. The binding to be removed can be to a target WWPN, target WWNN, or target D_ID.

Parameters:

WWPN - World Wide Port Name of the adapter whose persistent bindings you want to remove.

BindType - P = Remove binding by WWPN, N = Remove binding by WWNN, D = Remove binding by D_ID

ID - Target WWPN if BindType = P, Target WWNN if BindType = N, Target D_ID if BindType = D

SCSIBus - Bus number of SCSI device.

SCSITarget - Target number of SCSI device.

SetBindingSupport

Supported by: Windows and Solaris SFS

Syntax: hbacmd SetBindingSupport <WWPN> <BindFlag>

Description: Enables and sets the binding support(s) for the adapter.

Parameters:

WWPN - World Wide Port Name of the adapter whose binding support you want to set and enable.

BindFlag - *D = Binding by D_ID, P = Binding by WWPN, * N = Binding by WWNN, *A = Binding by Automap, DA = Binding by D_ID and Automap, PA = Binding by WWPN and Automap, NA = Binding by WWNN and Automap

* Not available for the Storport Miniport driver.

TCP/IP Management Host File Commands

See “Miscellaneous Commands” on page 146.

VPort Commands

<…> = Required, […] = Optional

CreateVPort

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd CreateVPort <physical WWPN> auto [vname]

or

hbacmd CreateVPort <physical WWPN> <virtual WWPN> <virtual WWNN> [vname]

Description: Creates a virtual port with an automatically generated WWPN or a specified virtual WWPN on the specified physical port. If you specify “auto”, the virtual WWPN will be generated automatically. Otherwise, you must specify the virtual WWPN for this parameter. If creation is successful, the WWPN is displayed as part of the output from the command. The optional [vname] parameter can be specified for the virtual port's name.

Parameters:

Physical WWPN - World Wide Port Name of the object adapter.

Virtual WWPN – The virtual World Wide Port Name.

Auto - The virtual WWPN will be automatically generated for the virtual port.

Vname - The virtual port's name (optional).

or

Physical WWPN - World Wide Port Name of the object adapter.

Virtual WWPN – The virtual World Wide Port Name to create.

Vname - The virtual port's name (optional).

DeleteVPort

Supported by: Windows, Solaris SFS and Linux

Syntax: hbacmd deletevport <physical WWPN> <virtual WWPN>

Description: Deletes the virtual port specified by a physical and virtual WWPN.

Parameters:

Physical WWPN - World Wide Port Name of the adapter from which you want to delete a virtual port.

Virtual WWPN - The WWPN for the virtual port.

ListVPorts

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server 3.5 and 4.0

Syntax: hbacmd listvports

Description: Lists virtual ports and the virtual machine name on the specified physical port. Leaving the physical wwpn parameter blank will list all virtual ports on all manageable hosts that support virtual ports.

The virtual machine name is only displayed if the virtual port is associated with a virtual machine on VMware ESX Server 4.0. If you are running this command on any other server that has virtual ports, you will not see the virtual machine name.

Parameters:

Physical WWPN - World Wide Port Name of the adapter on which you want to list virtual ports.

VPortTargets

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd vporttargets <physical WWPN> <virtual WWPN>

Description: Lists targets visible to the specified virtual port.

Parameters:

Physical WWPN - World Wide Port Name of the adapter on the targets are visible.

Virtual WWPN - The WWPN for the virtual port.

ListVMs

Note: This command lists information for ESX Server 3.5u4 and ESX Server 4.0 only.

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server 4.0

Syntax: hbacmd listvms

Description: Lists all virtual machines and their information for all manageable ports.

If the host is specified with the “h=<host>” option or just the physical wwpn is given, only the virtual machines for that host are displayed. If the physical port and the virtual port are specified, only the virtual machine for the specified virtual port is displayed.

Parameters:

Physical WWPN - World Wide Port Name of the adapter on the targets are visible.

Virtual WWPN - The WWPN for the virtual port.

WWN Management Commands

Note: WWN Management validates WWNs very carefully to avoid name duplication. Therefore, you may see error and warning messages if a name duplication is detected. It is strongly recommended that the activation requirement be fulfilled after each WWN change or restore. When running with “pending changes”, some diagnostic and maintenance features are not allowed.

ChangeWWN

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: ChangeWWN <WWPN> <New WWPN> <New WWNN> <Type>

Description; Changes the volatile or non-volatile state of WWNs. If the volatile change is requested on an adapter that does not support Volatile WWNs, a “not supported” error is displayed.

Note: When a volatile change is supported, a reboot is required to activate the new setting. Volatile names will be active until system power-down or adapter power-cycle.

Note: For VMware ESX Server: After changing the WWN of an adapter, be sure your zoning settings are updated before you reboot your ESX server. If the zoning is not updated before your reboot, the subsequent boot may take a long time.

Note: For VMware ESX 4i: After changing the WWN of an adapter, you must reboot the ESX 4i system before trying to access the adapter on that system. Refer to VMware’s documentation to learn how.

Note: For ESX 4.0 COS: If you are using the CIM Interface to access adapters, after changing the WWN of an adapter you must restart the CIMOM (i.e. SFCB) on the ESX 4.0 COS system before trying to access the adapter on that system. Refer to VMware’s documentation to learn how.

Parameters:

WWPN - World Wide Port Name of Object adapter.

New WWPN - New World Wide Port Name of Object adapter.

New WWNN - New World Wide Node Name of Object adapter.

Type - 0: Volatile,1: Non-Volatile

Get Capabilities (GetWWNCap on VMware and Solaris)

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd getwwncap <WWPN>

Description: Shows if volatile change is supported for the WWPN.

Note: A reboot is required to activate the new setting.

Parameters:

WWPN - World Wide Port Name of Object adapter.

ReadWWN

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: hbacmd readWWN <WWPN> <Type>

Description: Reads different types of WWNs.

Parameters:

WWPN - World Wide Port Name of Object adapter.

Type - 0: Volatile, 1: Non-Volatile, 2: Factory Default, 3: Current, 4: Configured

RestoreWWN

Supported by: Windows, Solaris SFS, Linux and VMware ESX Server

Syntax: RestoreWWN <WWPN> <Type>

Description: Quickly changes the WWNs back to the factory default or non-volatile values. This change is non-volatile.

Note: A reboot is required to activate the new setting.

Note: For VMware ESX 4i: After changing the WWN of an adapter, you must reboot the ESX 4i system before trying to access the adapter on that system. Refer to VMware’s documentation to learn how.

Note: For ESX 4.0 COS: If you are using the CIM Interface to access adapters, after changing the WWN of an adapter you must restart the CIMOM (i.e. SFCB) on the ESX 4.0 COS system before trying to access the adapter on that system. Refer to VMware’s documentation to learn how.

Parameters:

WWPN - World Wide Port Name of Object adapter.

Type: 0: Restore Default WWNs, 1: Restore NVRAM WWNs

Troubleshooting

There are several circumstances in which your system may operate in an unexpected manner. The Troubleshooting section explains many of these circumstances and offers one or more workarounds for each situation.

General Situations

Table 5: General Situations

Situation	Resolution
The FC link fails to come up.	Verify that an 8 Gb/s adapter is not attempting to connect to a 1 Gb/s device. Only 2 Gb/s, 4 Gb/s and 8 Gb/s devices are supported on 8 Gb/s HBAs.
The other utilities install, but HBAnyware does not.	You have attempted to install the utilities before installing the Emulex driver. Perform the installation tasks in the following order: 1. Install the Emulex driver (see the Installation section of the driver manual). 2. Install the utilities (see the Installation section of the driver manual).
When attempting to start HBAnyware the Web browser displays “Emulex Corporation HBAnyware Demo of HBAnyware WebStart web n.n.n.n...”	The document caching mechanism sometimes behaves erratically if more than one version of Java Runtime is installed on the browser client. There are two workarounds for this problem: • Exit the browser and restart it. HBAnyware with Web Launch starts successfully. • Uninstall all non-essential versions of the Java Runtime. HBAnyware Web Launch Service require that only a single version of the Java Runtime be installed on the browser client. This single version must be Java 5.0 or later for all platforms.
Operating Error Occurs When Attempting to Run HBAnyware. When you attempt to run the utility, an operating system error may occur. The computer may freeze.	Reboot the system.
Cannot See Multiple Zones from the Management Server. Cannot see multiple zones on the same screen of my management server running HBAnyware.	Provide a physical FC connection into each of the zones. For each zone you want to see, connect an HBAnyware utility enabled port into that zone. Use Out-of-Band discovery, Ethernet, to connect to the undiscovered server.

Table 5: General Situations (Continued)

Situation	Resolution
Cannot See Other HBAs or Hosts. Although HBAnyware is installed, only local HBAs are visible. The other HBAs and hosts in the SAN cannot be seen.	The utility uses in-band data communication, meaning that the management server running the utility must have a physical FC connection to the SAN. All the adapters in the SAN will be visible if: • The other servers have an FC connection to your zone of the SAN. Check fabric zoning. • All other HBAs are running HBAnyware and the appropriate driver. • The other HBAs are Emulex adapters. **Note:** HBAnyware must be running on all remote hosts that are to be discovered and managed. Remote capabilities of HBAnyware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAnyware must be in the same zone.
SAN Management Workstation Does Not Have an FC Connection. The SAN management workstation does not have a physical FC connection into the SAN because the other management tools are all out-of-band. Can HBAnyware be run on this SAN management workstation?	HBAnyware can communicate with remote HBAs using out-of-band access as long as the remote host is running HBAnyware. To solve this problem: 1. Start the HBAnyware utility. 2. From the **Main** menu, select **Discovery/Out-of-Band/Add Host**. The Add Remote Host dialog box appears. 3. In the Add Remote Host dialog box, enter either the name or the IP-address of the host and click **OK.** When the selected host is discovered, that host and any HBAs running on it will be displayed in the discovery-tree.
Cannot See New LUNs. Although new LUNs were created on the storage array, they do not appear in HBAnyware.	Refresh the screen.
The HBAnyware Security Configurator software package will not install. An error message states that the latest version of the HBAnyware utility must be installed first.	The system either has no HBAnyware software installed or has an older version of the HBAnyware software installed. In either case, obtain the latest version of the HBAnyware software and follow the installation instructions. Remember to install the HBAnyware software before installing the Security Configurator package.
Cannot access formerly accessible servers via the Security Configurator or the HBAnyware utility.	This is actually a symptom of two different problems. • New Keys Were Generated While Servers Were Offline • Security Removed While Servers Were Offline See Table 14 starting on page 166 for details regarding these problems.
Cannot run the Security Configurator on a system that is configured for only secure access. I cannot run the Security Configurator on a system that is configured for only secure server access (it has no client privileges). The following message is displayed when the Security Configurator starts: “This system is not allowed client access to remote servers. This program will exit.”	You cannot run the Security Configurator on a system that is configured for only secure server access. Click **OK** to close the message and the Configurator stops.

Table 5: General Situations (Continued)

Situation	Resolution
Unwanted remote servers appear in HBAnyware.	To prevent remote servers from appearing on HBAnyware, do one of the following: • In Windows, disable the HBAnyware service. • In Unix, disable the rmserver or elxhbamgr process. Disabling this service or process prevents the local servers from being seen remotely.

Emulex Driver for Windows and HBAnyware Situations

Table 6: Emulex Driver for Windows and HBAnyware Situations

Situation	Resolution
When you run setupapps.exe, lputilnt installs but HBAnyware does not. You have attempted to manually install the utilities for the driver before manually installing the driver.	Perform the installation tasks in the following order: 1. Install the driver (see the Installation section of the Emulex Storport Driver User Manual). 2. Install the utilities (see the Installation section of the Emulex Storport Driver User Manual).

Emulex Driver for Linux and HBAnyware Situations

Table 7: Emulex Driver for Linux and HBAnyware Situations

Situation	Resolution
FC link fails to come up	For LP.21000 adapters, ensure the adapter is not in maintenance mode and that it is not running the manufacturing firmware
The HBAnyware software package will not install. An error message states that: “inserv Service Elxlpfc has to be enabled for service ElxDiscSrvinserv: exiting now/sbin/ inserv failed exit code 1.”	Reinstall the driver with the lpfc-install script.
If a SAN configuration has 256 targets mapped by the LPFC driver, any additional added targets do not get a target ID mapping by the driver and cause target discovery to fail. Removing targets or reinitializing the link does not solve the problem.	Unload and reload the driver to reset available target IDs. Ensure that the SAN configuration is correct prior to reloading the driver. This will clear the driver’s consistent binding table and free target IDs for new target nodes.
In some cases, after loading an OEM supplied combined firmware/OpenBoot image you will not be able to enable BootBIOS from the lputil Boot BIOS Maintenance menu. If you encounter this problem after loading the OEM combined firmware/OpenBoot image, follow the steps outlined in the resolution.	1. Download the current OpenBoot only image for your adapter from the Emulex web site. 2. Load the current OpenBoot only image following steps listed in Updating BootBIOS section of this manual. 3. Run lputil, return to **Boot BIOS Maintenance** menu. 4. Enable BootBIOS.

Table 7: Emulex Driver for Linux and HBAnyware Situations (Continued)

Situation	Resolution
rmmod fails to unload LPFC driver module due to ERROR: Module lpfc is in use. This message can appear when you attempt to remove the driver and there is a Logical Volume Group dependent on the driver.	Make the Logical Volume Group unavailable. Type: `lvchange -a n xxxxxxx` where xxxxxx is the Volume Group Name.
LP1005DC-CM2 reported as the LP1050DC. When running lspci or kudzu utilities, you may see the Emulex FC Host Adapter LP1005DC-CM2 reported as the Emulex FC Host Adapter LP1050DC for the pci_id address f0a5. This is due to a delay in getting the pci_id tables updated in the Red Hat and SuSE distributions.	None at this time
An lspci shows recent Emulex HBAs as “unknown”. This is because of the delay of getting new product ID's into the Red Hat and SuSE development cycle.	The VMPilot™ management application (VMPilot 1.2) is a remote-management utility that enhances SAN support for Microsoft Virtual Server using ANSI standard N-Port ID Virtualization (NPIV). VMPilot allows you to create and manage Virtual Ports (VPorts) that provide a virtualized connection to SAN-attached storage. **Note:** If you use the VMPilot management application on more than one host in the system, version 1.2 must be installed on every host using it. Version 1.2 is not compatible with any earlier version. **Note**: HBAnyware can only discover and manage remote HBAs on hosts that are running HBAnyware's elxhbamgr. For in-band management, remote capabilities of HBAnyware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAnyware must be in the same zone.
Slow targets or extended link faults on the storage side may result in storage being marked off-line by the mid-layer and remaining off-line (not recovered) when the link faults are corrected.	This version of the driver should eliminate this problem. However, if you experience off-line device issues, increase the SCSI command timeout to a value greater than or equal to sixty seconds. Emulex also provides a script which addresses this issue (for 2.6 kernels). To access the lun_change_state.sh script, click http://www.emulex.com/support/linux/index.jsp, then click the link to the appropriate driver, and click the Linux tools link.
Under certain conditions of an I/O load, some targets cannot retire an I/O issued by a Linux initiator within the default timeout of 30 seconds given by the scsi midlayer. If the situation is not corrected, the initiator-to-target condition deteriorates into abort/ recovery storms leading to I/O failures in the block layer. These types of failures are preceded by a SCSI IO error of hex 6000000.	Emulex provides a script which addresses this issue. To access the set_target_timeout.sh script, click http://www.emulex.com/support/linux/index.jsp, then click the link to the appropriate driver, and click the Linux tools link.

Table 7: Emulex Driver for Linux and HBAnyware Situations (Continued)

Situation	Resolution
LPFC driver fails to recognize an adapter and logs "unknown IOCB" messages in the system log during driver load. The adapter is running outdated firmware.	Upgrade adapter firmware to minimum supported revision listed in installation guide (or newer).
rmmod of LPFC driver hangs and module reference count is 0.	Due to a small race condition in the kernel it is possible for an rmmod command to hang. Issue the `rmmod -w` command. If this does not help, reboot the computer.
System panics when booted with a failed adapter installed.	Remove the failed adapter and reboot.
LPFC driver unload on SLES 9 causes messages like the following to be logged in the system log: "umount: /dev/disk/by-path/ pci-0000:02:04.0-scsi-0:0:1:0: not mounted"	These messages are normal output from the SLES 9 hotplug scripts and can be safely ignored.
rmmod fails to unload driver due to device or resource busy. This message occurs when you attempt to remove the driver without first stopping HBAnyware, when HBAnyware is installed and running or when FC disks connected to a LightPulse adapter are mounted.	Stop HBAnyware before attempting to unload the driver. The script is located in the /usr/sbin/hbanyware directory. Type: ./stop_hbanyware Unmount any disks connected to the adapter. Unload the driver. Type: rmmod lpfc
Driver Install Fails. The lpfc-install script fails to install the driver.	The install script may fail for the following reasons: • A previous version of the driver is installed. Run the lpfc-install --uninstall script and then try to install the driver. • The current driver is already installed. • The kernel source does not match the standard kernel name or you are running a custom kernel.
"No module lpfc found for kernel" error message. When upgrading the kernel, rpm generates the following error: "No module lpfc found for kernel KERNELVERSION". A recently upgraded kernel cannot find the ramdisk. After upgrading the kernel, the kernel cannot find the ramdisk which halts or panics the system. The driver is not loaded after a system reboot after upgrading the kernel.	These three situations may be resolved by upgrading the kernel. There are two ways to install the driver into an upgraded kernel. The method you use depends on whether or not you are upgrading the driver. • Upgrade the kernel using the same version of the driver. • Upgrade the kernel using a new version of the driver. See the Installation section of the driver manual for these procedures.
Driver uninstall fails. The lpfc-install --uninstall script fails with an error.	Try the following solutions: • Uninstall the HBAnyware and SSC software packages. These can be removed by running the ./uninstall script from the HBAnyware installation directory. • Unmount all FC disk drives. • Unload the LPFC driver.
lpfc-install script exit code.	The lpfc-install script contains exit codes that can be useful in diagnosing installation problems. See the lpfc-install script for a complete listing of codes and definitions.

Table 7: Emulex Driver for Linux and HBAnyware Situations (Continued)

Situation	Resolution
The HBAnyware software package will not install. An error message states that: "inserv Service Elxlpfc has to be enabled for service ElxDiscSrvinserv: exiting now/sbin/ inserv failed exit code 1."	Reinstall the driver with the lpfc-install script.
The Emulex driver for Linux does not load in ramdisk for a custom built kernel.	Custom built kernels are not supported by Emulex. However, the Emulex install script will attempt to install the driver into a ramdisk that follows the naming scheme used by Red Hat or SLES kernels. • The Red Hat naming scheme for IA64 ramdisk images is: /boot/efi/efi/redhat/initrd-KERNELVERSION.img. • The Red Hat naming scheme for ramdisk images on all other architectures is: /boot/initrd-KERNELVERSION.img. • SLES names follow a similar scheme for IA64. If a custom built kernel has a ramdisk image that does not follow the appropriate naming scheme, the name of the image can be changed using the following procedure: 1. Change the name of the ramdisk image to match either the Red Hat or SLES naming scheme, depending on the distribution being used. 2. Update any file links to the HBAnyware ramdisk image. 3. Edit the boot loader configuration file: (i.e., /etc/lilo.conf, /etc/yaboot.conf, /boot/grub/grub.conf, /boot/grub/menu.lst), find any references to the old ramdisk image name, and replace them with the new name. 4. Reboot the system to verify the changes. 5. Install the Emulex LPFC Linux driver kit.
The Linux SCSI subsystem only sees 8 LUNs when more are present.	Some SCSI drivers will not scan past 8 LUNs when the target reports as a SCSI-2 device. Force SCSI Bus scan with /usr/sbin/ lpfc/lun_scan. SuSE supplies /bin/rescan-scsi-bus.sh which can be changed to scan everything.
Cannot See Any HBAs. You launch HBAnyware and no adapters are visible.	Try the following solutions: 1. Perform an 'lsmod' to see if the Emulex drivers are loaded. Look for an error message on the command line stating the LPFC driver is not loaded. If this is the case, do an insmod of the LPFC driver and re-launch HBAnyware. 2. Exit HBAnyware and run ../stop_hbanyware. Then run ./ start_elxhbamgr and ./start_elxdiscovery, and re-launch HBAnyware. The adapters should be visible. If they are not visible reboot your system.

Table 7: Emulex Driver for Linux and HBAnyware Situations (Continued)

Situation	Resolution
Cannot See Other HBAs or Hosts. Although HBAnyware is installed, only local adapters are visible. The other adapters and hosts in the SAN cannot be seen.	All the adapters in the SAN will be visible if: • The other servers have a connection to your zone of the SAN. Check fabric zoning. • The elxhbamgr processes are running on remote hosts (enter ps -ef | grep elxhbamgr). • All other HBAs are running HBAnyware and the appropriate driver. • The other HBAs are Emulex adapters. **Note:** HBAnyware services must be running on all remote hosts that are to be discovered and managed. If the HBAnyware Security Configurator is running, only the master or Access group client can see the servers.
Cannot See New LUNs. Although new LUNs were created on the storage array, they do not appear in HBAnyware.	Try the following: 1. Refresh the screen. 2. Exit HBAnyware and restart HBAnyware. If new LUNs are visible, you are finished. If that doesn't work, try the following: 1. Exit HBAnyware. 2. Navigate to /usr/sbin/hbanyware. 3. Run ./stop_hbanyware to stop both the elxhbamgr and elxdiscovery processes. 4. Run ./start_elxhbamgr and ./start_elxdiscovery to restart both processes. 5. Start HBAnyware.
Unwanted Remote Servers Appear in HBAnyware	To prevent unwanted servers from appearing in HBAnyware, do the following: 1. Navigate to /usr/sbin/hbanyware. 2. Run ./stop_hbanyware to stop both the elxhbamgr and elxdiscovery processes. 3. Run ./start_elxhbamgr and ./start_elxdiscovery to restart both processes. Disabling this service or process prevents the local servers from being seen remotely.
Cannot access formerly accessible servers via the Security Configurator or the HBAnyware utility.	This is actually a symptom of two different problems. • New Keys Were Generated While Servers Were Offline • Security Removed While Servers Were Offline See Table 14 starting on page 166 for details regarding these problems.

Emulex Driver for Solaris and HBAnyware Situations

Table 8: VPorts and HBAnyware Situations

Situation	Resolution
A COMSTAR port on a remote Fibre Channel or TCP/IP managed systems appears as an initiator port in the HBAnyware discovery-tree or an initiator port appears as a COMSTAR port.	The discovery-tree on the local HBAnyware client has not been refreshed since the remote port was switched to COMSTAR or initiator mode. To resolve this issue, exit and restart the HBAnyware application. If viewing HBAnyware via the WebLaunch interface, the WebLaunch server daemon must be restarted: 1. Run /opt/HBAnyware/stop_weblaunch to stop the server daemon. 2. Run /opt/HBAnyware/start_weblaunch to start the daemon. To prevent this situation from occuring again, perform the following steps on the local HBAnyware client: 1. From HBAnyware's main menu bar, select **Discovery-->Modify Settings...** to open the Discovery Settings dialog box. 2. In the Undiscovered Adapter Expiration box, change the "Remove after" value to 0. 3. Click **OK**.

VPorts and HBAnyware Situations

Table 9: VPorts and HBAnyware Situations

Situation	Resolution
VPort Creation Failure	If an error occurs during VPort creation, an error message indicates the failure.
Virtual Ports for Unsupported Adapter or Host	When you select an unsupported adapter port or host that is running an older version of the HBAnyware utility, “Virtual Ports not available on this HBA or Host”. appears in the Virtual Port window.
Port Not Ready	The controls in the New Virtual Port box of the Virtual Port window are replaced by a list of reasons why VPorts cannot be created. The reasons can be one or more of the following: Driver NPIV parameter is disabled. • SLI-3 is not being used by port. • Adapter port is out of resources for additional virtual ports. • The port is not connected to a fabric. • The fabric switch does not support virtual ports. • The fabric switch is out of resources for additional virtual ports. • The port link state is down.

Security Configurator Situations - Access Control Groups (ACG)

Table 10: Access Control Groups Situations

Situation	Resolution
All servers are not displayed under one of these two circumstances: • When I run the Security Configurator on the MSC, I do not see all of the systems in available servers or ACG Servers lists. • When I run the Security Configurator on a non-MSC, I do not see all of the systems I should see in the ACG Servers list.	Make sure all of the systems are connected to the FC network and are online when you start the Configurator. Discovery of the systems is done only once, at startup. Unlike the HBAnyware utility, there is no Discovery Refresh button. Therefore, the Security Configurator must be restarted to rediscover new systems.
Cannot add or remove a server. The Security Configurator shows only a list of the systems in this system's ACG. I cannot add or remove systems from the ACG.	This is normal. You can modify the ACG for your system only on the MSC or on a parent client system.
HBAnyware utility shows non-ACG Servers. The HBAnyware utility shows servers that are part of the ACG and that are not part of the ACG.	The HBAnyware utility discovers unsecured servers as well as servers that are part of its ACG. The servers you see that are not part of the ACG are unsecured. They are discovered by any system running the HBAnyware utility on the same FC fabric.

Security Configuration Situations - Access Sub-Groups (ASG)

Table 11: HBAnyware Security Configurator - Access Sub-Groups Situations

Situation	Resolution
Cannot add or remove a server.	When all of the systems in an ACG are running on a single fabric, they are all available to be added to any ASG. However, if the client is connected to more than one fabric, it is possible that not all of the servers in the client's ACG are physically accessible by a chosen client for an ASG. In this case, those servers are not available to be added to that ASG. If you add a system to an ASG as a server, and then make the system a client to a child ASG, you cannot remove it from the ACG it belongs to as a server until you delete the ASG to which it is a client. Before you delete a server from an ASG, you must first remove the server from any lower level ASGs to which it belongs.
In the ASG tree of the Access Sub-Groups tab, one or more of the names of the ASGs is displayed as “- ASG (Client Offline) -”.	The client system for the ASG was not discovered when the Configurator was started. This is actually a symptom of two different problems. • All Servers Are Not Displayed • New Keys Were Generated While Servers Were Offline See Table 14 starting on page 166 for details regarding these problems.

Table 11: HBAnyware Security Configurator - Access Sub-Groups Situations (Continued)

Situation	Resolution
Not All Servers are available to an ASG. When you create a new ASG or modify an existing ASG, not all of the servers in the ACG are available to be added to the ASG.	A client system can be connected to more than one fabric. While the system the Security Configurator is running on can access all of the servers in its ACG, the selected client for the ASG might not have access to all of the servers. Only those that can be accessed by the selected server will be available.

HBAnyware Security Configurator Situations - Backup Masters

Table 12: HBAnyware Security Configurator - Backup Masters Situations

Situation	Resolution
Cannot create a backup master.	Select a system (or group of systems) from the MSC to be the Backup Master. The system must be either an unsecured system (which will be secured by being made a Backup Master), or a system that is not part of any ASG (client or server). These systems will mirror the MSC's security configuration. Because the Backup Master may some day take over as the MSC, the Backup Master must be able to physically access all of the systems that the MSC can access. Therefore, if the MSC is connected to multiple fabrics, the Backup Master also must be connected to those same fabrics. When you select a Backup Master, the HBAnyware Security Configurator displays a warning if it detects that the system selected to be a Backup Master is not able to physically access the same systems that the MSC can access.
Cannot modify the Security Configurator.	Select a system (or group of systems) from the MSC to be the Backup Master. The system must be either an unsecured system (which will be secured by being made a Backup Master), or a system that is not part of any ASG (client or server). These systems will mirror the MSC's security configuration. The Backup Master has client access from the HBAnyware utility to all of the servers in the MSC's ACG. However, the Backup Master does not have client access to the MSC and it cannot modify the security configuration (create, modify or delete ASGs).
No Backup Master and the MSC is no longer available. I do not have a Backup Master and the MSC system is no longer available. The servers are still secure. I installed the Security Configurator on another system, but I cannot access those servers to remove the security from them.	The servers are no longer part of a valid security configuration because there is no MSC to provide master control of the configuration. In order to reset the security on the affected servers, you must contact Emulex Technical Support to receive a special application and instructions on the reset procedure. After the servers have been reset, they should be seen by the Security Configurator and the HBAnyware utility. At this point, you can set up security again through another MSC. At this time, also create a Backup Master.
The Backup Master tab is not available.	The Backup Master tab is displayed only when the Security Configurator is running on the MSC or a Backup Master. You use this tab to set up a system or systems to be backups to the MSC and to replace the MSC with a Backup Master. Each time you start the Security Configurator on the MSC and there is no Backup Master assigned, a warning message urges you to assign at least one Backup Master to prevent the loss of security information if the MSC were to become disabled.

Error Message Situations

Table 13: Error Message Situations

Situation	Resolution
Error Message Appears When Creating an ASG. This message appears when you create an ASG: “The Access Sub-Group name already exists. Please use a different name.”	You entered a duplicate ASG name in the Access Sub-Group Name field. At each level of the security topology, each ASG name must be unique. Click **OK** on the message and enter a unique ASG name.
Error Message Appears When Deleting an ASG. This error message appears when you delete an ASG: “The Access Sub-Group parent’s ASG is offline. You should delete the ASG when the parent ASG is available. This ASG should only be deleted if the parent ASG will not be available again. Are you sure you want to delete this ASG? “	The offline ASG entry serves as a placeholder for where the real ASG would be in the tree. You can neither modify nor delete it (although it is removed from the display if all of the child ASGs are deleted). It is possible to delete the child ASGs of the offline ASG. However, it is recommended that you delete them only if the client for the offline ASG will never be put online again. It is best to delete child ASGs when the parent ASG is online. Click **Yes** on the error message to delete the ASG or **No** to close the message without deleting.
Error Message Appears When Starting the HBAnyware Security Configurator. This message appears when you start the Security Configurator: “This system is not allowed client access to remote servers. This program will exit.”	The system you are running the Security Configurator on is already under the security umbrella as a server to one or more clients. To make this server a client (so that it can successfully run the Security Configurator), click **OK** to close the message and exit the program, then do the following: 1. Run the Security Configurator on the MSC or on any client that has this server in its ASG. 2. Make this server a client to a group of servers.
Error Message States “No Backup Master Client Assigned”. This message appears when you start the Security Configurator: “There are no Backup Master Client Systems assigned to this security configuration. At least one should be assigned to avoid loss of the security configuration should the Master Client System become disabled.”	Use the Backup Master tab to assign a Backup Master for the MSC.
Error Message States “Utility is Running on an Unsecure System”. This message appears the first time you start the Security Configurator in an unsecure environment: “This utility is running on an unsecure system. Continuing will allow you to set up a new security configuration making this system the Master Client System.”	Click **OK** on the message and complete the ACG setup. The system on which the Security Configurator is running will become the MSC.
Error Message States “System is a Backup Master Client System”. This warning appears when you start the Security Configurator on a Backup Master system. “Warning: This system is a backup master client system. Therefore you will only be able to view the security configuration. To make changes, you will need to run this utility on the master client system.”	Because each Backup Master system receives all the updates that the MSC makes to the security configuration, the Backup Master systems must be online when the Security Configurator is running on the MSC. Otherwise, updates to the security configuration are not reflected to the Backup Master. If the Backup Master becomes the MSC, corruption of the security configuration may occur. Click **OK** to close the message.

Master Security Client Situations

Table 14: Master Security Client Situations

Situation	Resolution
The MSC is no longer bootable or able to connect to the FC network.	You must reassign a Backup Master as the new MSC from the Backup Master. **Warning:** Use this procedure **only** if the MSC cannot relinquish control to a Backup Master. For example, if the MSC is no longer bootable or able to connect to the FC network. Under any other circumstances, if the Backup Master takes over as the MSC and the MSC is still running or comes back online later, there will be two MSCs for the same security configuration. This will eventually lead to corruption of the security configuration.
New Keys Were Generated While Servers Were Offline. Now those servers can no longer access the HBAnyware Security Configurator or the HBAnyware utility.	The servers are no longer part of the security configuration. In order to reset the security on the affected servers, you must contact Emulex Technical Support to receive a special application and instructions on the reset procedure. After the servers have been reset, they can be added back into the security topology by the MSC. **Note:** If the server was also a client to an ASG, then when you run the Security Configurator on the MSC or a parent client of this client, its label in the ASG tree of the Access Sub-Group tab will be "- ASG (Offline Client) -". You must delete the ASG (after deleting the child ASGs) and recreate the ASG configuration of this client and its child ASGs.
Security Removed While Servers Were Offline. Security was removed while one or more servers were offline. I can no longer access those servers from the Security Configurator or the HBAnyware utility.	The servers are no longer part of the security configuration. In order to reset the security on the affected servers, contact Emulex Technical Support to receive a special application and instructions on the reset procedure. After the servers have been reset, they should be seen by the Security Configurator or the HBAnyware utility.